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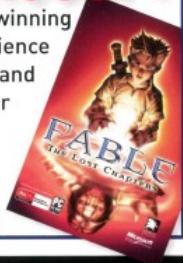
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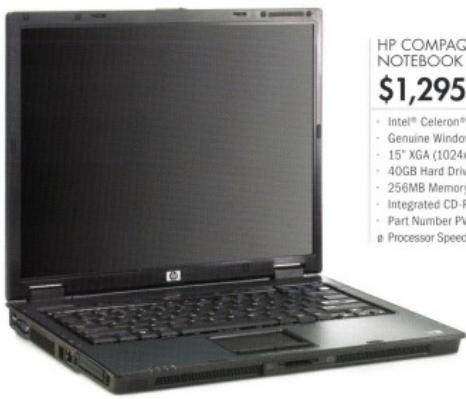


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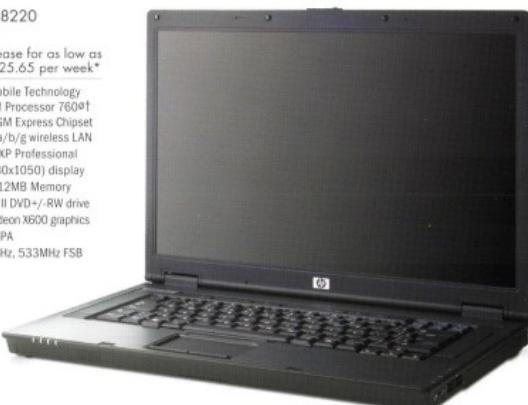
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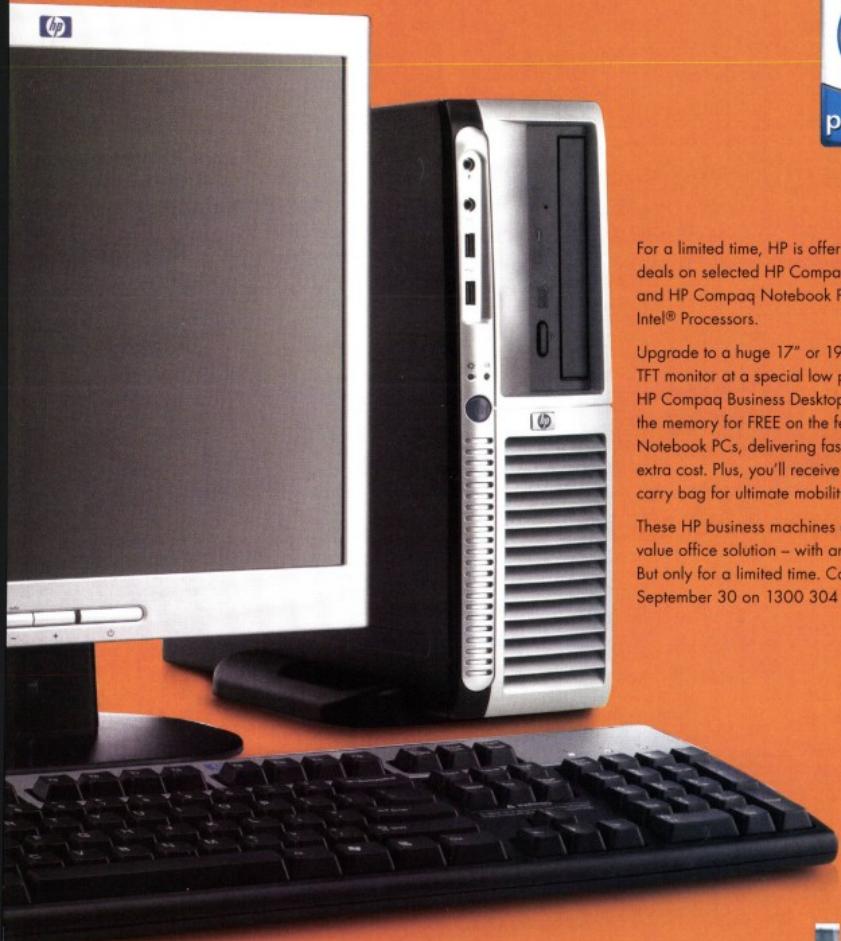


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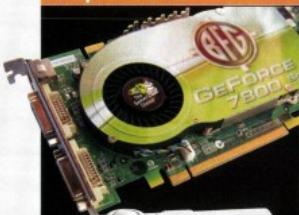
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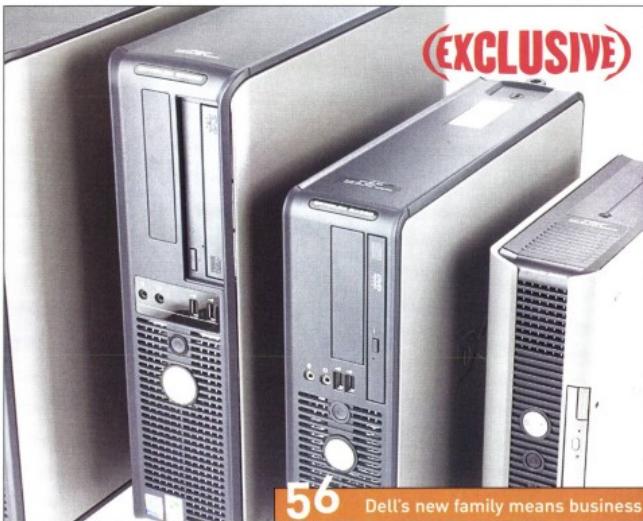
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The next decade will see ever more wires cut. From PANs to WANs, every device you own won't just be talking, they'll be doing it over the airwaves. Our glimpse into the very near future starts here.

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AUSTRALIAN PC AUTHORITY

THIS MONTH'S TOP GEAR

▼ Belkin's MIMO contender still on top

[NO ONE TESTS TECH LIKE PC AUTHORITY]



► Albatron's 7800 GT: top value power.



▼ Epson's flatbed: great value, beautiful results.



▲ Altech's wonder machine cuts up the bitumen.



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LOGIN

When optic fibre started pumping high speed Net access into our homes, it was easy for us to assume this to be the future for broadband. It was exclusive to certain areas, and damn expensive, but the low latencies and high throughput put this far above any other technology. Now, Australia's broadband connections are dominated by copper-based DSL, which is now exceeding cable connections and offers the best price point.

But in the end, these are still cables that rely on an extensive infrastructure – an area that Australia doesn't have a particularly good track record with. Wireless internet, then, is almost too good to be true. While the technology is still relatively immature in comparison to its wired counterparts, it's hard not to be enamoured by the potential. No phone line activations, no onsite technicians, just a wireless signal and you're in.

'Our reviews will now list the cheapest price and reseller, so you can rest assured that you're getting a good deal.'

While we're still a long way from enveloping the country in a wireless cloud, it's easy to see that this will be a major player in the coming years.

In taking the theme of a wireless world one step further, we looked at the current and future technologies in PANs (personal area networks) and LANs. Phones, mice, keyboards, PCs, televisions – all have the potential to be connected in a network that you can customise and control. Today, you can get a glimpse of this with the latest in wireless routers, which will connect to the Internet, network your PCs, or even provide a VoIP outlet for a handset. Our Labs this month has all the answers.

Before I sign off I want to point out PC Authority's new commitment to finding the cheapest prices. Our reviews will now list the cheapest price and reseller, so you can rest assured that you're getting a good deal. Feedback is always welcome, and if you want your store to take part in this unique opportunity, contact me at the email below.

David Kidd, Editor

dkidd@pcauthority.com.au



Techdesk

Latest news, trends and products in the world of technology.

HANDHELD HISTORY

A timeline of playtime



1980

This is how it all began. Slow, static LEDs, flashing randomly enough for someone to call it a game. Ski Slalom? Hmmm.



1982

But we couldn't get enough of them. Combining 'cutting edge' LCD screens and Space Invaders made you school yard royalty.



1989

After years of single game LCDs, The Daddy arrived. The Gameboy and its changeable cartridges blew the competition away.



1990

Sega's Game Gear was better – colour and sound – but bulkiness and poor battery life sealed its fate.

1991

The model II Atari Lynx was years ahead of its time, but it was too late. Gameboy had the market.



▲ The PSP can do more than you think it can – but will Sony let you?

SINS OF THE FLASH

Sony plays hardball with hackers over the new PSP.

Sony are taking a tough line with hackers trying to crack its new PSP – but not through legal action.

The new games machine launched this month is a powerhouse of pocket PC wizardry, but some of its best features have yet to be unlocked. As well as playing games, video and MP3s, it can also be a fully fledged Web browser and much, much more.

Hackers have already spotted its potential and released a variety of hacks to enhance hidden features and also allow pirate games and videos to run on it.

But Sony are hitting back in a trailblazing new strategy. They appear to have deliberately withheld certain features which are only unlocked when the user updates to the latest

flash ROM running the PSP. This allows them to keep one step ahead of the hackers – as soon as they find a new exploit, Sony can rewrite the ROM to lock hackers out, and bundle a few sweeteners to entice users to update.

BELLS AND WHISTLES

The latest update released in Japan is v2.0 which includes a sophisticated Web browser (with tabs)...and has so far proved impenetrable to hackers...The upside is regular Sony updates with new bells and whistles, the downside is you are restricted to only using it for the purposes Sony can charge you for. But for \$399, some argue all features should already be available – and they should be able to use their PSP any way they like.



1998

Almost a decade after Sega and Atari, Nintendo finally brought colour to the Gameboy.

2003

Nokia tried to muscle in on the handheld gaming market with the N-Gage. Hardly anyone noticed.

2005

Nintendo's 16 year monopoly nearing an end, they beat the PSP out with the DS – but it's no PSP.

The PSP is destined to be the new iPod – but can it rule the roost as long as the Gameboy did?

'The PSP is the first entertainment Swiss Army Knife.'

Says Sony Pictures chief Yair Landau, subtly ignoring the fact that the Swiss Army didn't care if you used their knife to open the lid of a tin of paint rather than to take a stone out of a Swiss Army-approved horse's hoof. In Switzerland.

NEW VISTAS FOR LONGHORN

Name change as Microsoft launches first public beta.

The long-awaited public beta of Longhorn has finally been released – except it's not Longhorn any more. It's Vista, which obviously makes it *much better*. Well, Microsoft thinks so anyway.

That's it on the right. Radical isn't really a word that springs to mind when you see it. Actually apart from a few minor cosmetic details, your average XP user will probably just think someone has simply installed a new skin theme for their desktop.

Under the skin though, it's all change. OK, *a few* changes at least. Some of the really annoying things about XP (like having your desktop folder hidden away next to your email folders) and having My Music in the My Documents folder have been fixed.

Elsewhere in the update, security's been tightened and navigation has been made simpler. But paradoxically, in the process, it's also been made more complicated.

RECIPE FOR DISASTER?

One of the new innovations is virtual folders which automatically group files by author, or by CD, or so on. The folders themselves aren't real – it's just the built-in search engine grouping files together in one easy place for you to find them all without having to trawl through all your drives. The files are still in the folders they were originally put in.

However, if you decide to delete these non-real virtual folders (because they aren't actually *real* after all), the files they contain are real...and will be wiped off your hard drive in the process. We foresee tears before bedtime with this one...

However it's still only in its beta 1 stage, so expect changes and new features before a full release in 2007-ish.

At the moment, testers reckon this build is almost as stable as XP, but appears to have a few network issues. Minimum spec is about the same as XP but with 512MB RAM and a reasonable video card. Should a copy fall into your hands, install it on a desktop as the beta isn't keen on proprietary XP drivers as found in laptops.



What's in a name? Lawsuits, mainly

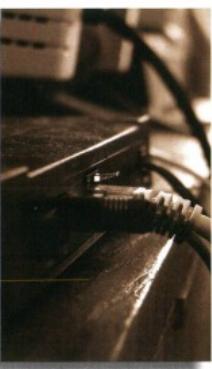
Microsoft's name change for Longhorn could cost it in the courts with a line of companies queuing up to sue the software giant.

MS insists it has trademarked the name 'Windows Vista' around the world – but that hasn't placated the many other firms.

Chief among them is a company just down the road from MS in Redmond. Vista Inc sells 'online solutions to small and mid-sized businesses' – a bit like Microsoft then. CEO John Wall is holding fire to see how much public confusion there is before making a decision on taking legal action.

But Vista Software Alliance is even less happy. They provide the Vista software used for the medical records and health care of American war veterans. 'The confusion between the operating system and the software is an affront to the people who take care of our nation's veterans,' says Vista's Barbara Boykin.

MODEM MAYHEM SAYS WATCHDOG



Firmware updates could actually cause users connection problems because their modem will no longer be Telstra compliant.

Telstra's testing firm Contest has warned manufacturers are getting modems approved – then later updating with invalid firmware.

The issue came to light after Netcomm NB1300 users reported problems after updating. Contest fears it could be a symptom of a wider problem. Netcomm insisted all its firmware updates were submitted to Contest for approval.

Meanwhile Netcomm are offering a free hardware upgrade to users of NB55s shipped before March 2005 to guarantee they will be ADSL2-ready.

'Will it sell? Probably. Then Microsoft can celebrate having the 1 millionth product named Vista.'

We like the way marketing analyst Mark Stevens thinks.

GTA cover up patch

■ In a game where drug-dealing, pimping, drive-by shootings, unprovoked murders, vicious assaults and savage muggings are routine, it is an explicit sex scene which has caused a stir. Rockstar has rushed out a patch to preserve the dignity of its PC version of GTA: San Andreas after hackers unlocked explicit sex scenes in the game. Risking an outright worldwide ban over the filth furore, Rockstar has released a patch which stops the pixel porn.

Google gives up

■ Google's plans to take over the universe have hit a speed bump. Google Print intended to scan in rare books found in libraries and make their content searchable...without giving a cent to authors or publishers. The European operation was abandoned earlier this year, now it's US plans have also been put on hold after an outcry from the publishing industry.

Porn sight

■ Porn will make you go blind... but only for a moment. US psychologists have found people shown either erotic or gory scenes, such as those found in games, can't process images shown immediately afterwards. They call it 'emotion-induced blindness' and safety experts are using the report to demand an end to saucy billboard posters near busy roads.

Crashes spark rage

■ Computer crashes, spam and mobile phones are all adding to the pressure of modern office life in Australia – and sparking tech rage outbursts in the workplace. A survey of 400 office workers in Sydney and Adelaide found an average of nine PC crashes a week.

Apple Mighty Mouse

■ Apple has succumbed and released a mouse with a right button. The new mouse isn't called iMouse surprisingly – but Mighty Mouse – and can even be used on a PC. OSX for PCs? With Apple finally releasing a two-button mouse, anything's possible.

Earth to Google

■ Australia's nuclear chief was rattled to find satellite pics of his Lucas Heights plant in hi-res detail thanks to Google Earth. Now the US Army has the fear over similar pics of their HQs in Iraq. Army chiefs believe terrorists could use it to target precision attacks on them. Google's defence is that pics are a year old – but the army says its battle camps are still the same a year later. Of course, Google could always trace the IPs of all PCs calling up the sensitive areas. Google tracking down Bin Laden would be the ultimate coup for a search engine after all...

Gaming all-clear

■ Online gaming was given a boost when a scientific study found hardcore gamers were no more aggressive after prolonged spells online than a control group. Despite averaging 56 hours gaming a month on Aheron's Call 2, there were 'no strong effects associated with aggression caused by this violent game,' said report author, Dmitri Williams of the University of Illinois.

Erm, then again...

■ A South Korean died of heart failure after playing a computer game online for 50 hours almost non-stop. Identified only as Lee, 28, he played for three days at a cyber cafe in Taegu, taking breaks only to go to the toilet and brief naps on a makeshift bed. Lee was reported to have recently given up his job to devote more time to playing online.

Special offer for PC Authority readers

■ Feel like swapping your keyboard for steering wheel? Thanks to D-Link, we are putting three readers (one from NSW, Vic and QLD) behind the wheel of a V8 race car, which includes five laps, tuition, in-car video and more! All you need to do is subscribe to PC Authority here: www.pcauthority.com.au/dlinkv8. Enter now for this exclusive offer, and if you miss out on the main prize, you could win one of five copies of Atari's V8 Supercar for virtual race fun.

Most wanted

'Policy-makers should seek a greater understanding of the games they are debating.'

Dmitri Williams found more good than bad in online gaming – but will politicians care when there are easy votes to win?

HOT...**iPAQ 6715**

Last month it was the rumoured arrival of the Smartphone version of Motorola's spectacular V3 Razr mobile. But that excitement was tempered by a lack of Wi-Fi. HP were obviously listening. They are about to start flogging a Wi-Fi enabled version of the iPAQ 6515 smartie. We like it. <http://tinyurl.com/ey77l>

REARVIEW GPS

Another 'Why didn't I think of that?' idea – a rearview mirror with an LCD screen which can display GPS navigation maps OR the feed from a webcam in the back bumper for reversing. No more staring at the centre console while you pile into the back of a truck. Utter brilliance. <http://tinyurl.com/a2az2>

WOLFCLAW KEYBOARD

In the past, peripherals specifically designed for FPS games have been a great way to exchange your cash for a lingering sense of disappointment. But this one actually looks like it might work. All your left hand functions are laid out in a logical way. And it's got a great name.

www.wolfclaw.com.sg

AUTOMATIC DOOR

This is supposed to be A Real Product, but our Japanese isn't good enough to tell for sure. Even if it's not, it's a fabulous idea. Infra red sensors automatically detect your approach and shape, and blinds slide open to fit. Not so good for anyone with a nervous twitch, however. <http://tinyurl.com/chcda>

SONY MONITOR

It takes a special monitor to make it into Most Wanted but if these live up to the standard of Sony's laptop screens, the SDM-HX95 will earn its place here. Sporting a 19" Clearview LCD screen with settings for gaming, movies and PC work, images should sparkle at its imminent Oz launch. www.sony.com.au

PSP

What else could it be this month? Even technophobes have been blown away by its astonishing screen and sleek looks. There's little this thing can't do, especially in the hands of some keen hackers.

Broadband speeds

By the time you read this, broadband could have taken a major step forward in Australia. Talk is that Telstra are about to announce a minimum ADSL speed of 1500Kbps (no more 256Kbps nonsense) – and even an early roll out of ADSL2-type speeds. Then again, maybe not...

whirlpool.net.au

From its humble origins, the site has matured into a great resource for the local Internet scene. Now it has responded to attempted legal bullying from one ISP by threatening to cut them off from the site. Love it!

Plasma and LCD TVs

Been to the shops recently? Prices of these are plummeting. You can hang a metre of Network Ten on your wall for less than a week's wages. Not exactly dirt cheap admittedly, but compared to prices even a year ago, they're a bargain. Better still, the cost of big screen CRT TVs is dropping to pocket money prices as a result.

Nokia 8800 guests

In a fit of astonishing generosity, Nokia launched their new flagship mobile at a select gathering of Australia's movers and shakers... and gave everyone there a free fully-working, unlocked \$1800 phone. OK, so the buttons are too small and the camera is pants but this is a very slick, tiny, shiny phone and status symbol. Despite that, days later eBay was clogged with new 8800s for sale – each one an unwanted gift.' 



WI-FI TO THE MAXXX...

A new world record for a Wi-Fi transmission was recently set during the 3rd Annual Defcon Wi-Fi Shootout contest. The iFiber team managed to beam a full 11Mb/s speed connection over a distance of 201 kilometres.

Even though the transmission occurred over the flat, obstacle-free desert of Nevada, it's an astounding distance considering the signal wasn't even amplified.

According to the sponsors of the competition, Wired magazine, the winners of the competition used a combination of 12 foot satellite dishes, scaffolds and home welded support structures to build the transmitter and receiver.

We're pretty confident that at least one coat-hanger, bent into the shape of Australia, was also used in the construction.

JAPANESE ARE KING OF FLOPS

Raising the stakes in the race for the fastest supercomputer.

Remember when a few teraflops of computing power was impressive? Now even gaming consoles can pull off this kind of computational prowess, with both the Xbox 360 and PS3 touted as being capable of teraflop levels of performance (provided you believe their marketing teams).

Now that teraflops are *passé*, serious computer scientists have to make their supercomputers bigger and better than ever before, and it looks like the Japanese will be leading the charge.

Japan's embarrassingly named Ministry for Education, Culture, Sports, Science and Technology recently announced plans to develop a supercomputer so powerful that it will be five times the speed of the world's existing 500 fastest systems – combined.

WILL IT RUN XP?

The theoretical peak performance of the supercomputer will be approximately 10 petaflops, easily



▲ IBM's Blue Gene /L – stunningly fast but ugly as sin and utterly overwhelming to look at.

beating the 136.8 teraflops that today's current top dog, Blue Gene/L, can perform.

At this speed, the system will be capable of carrying out 10 x 10 to the power of 15 floating-point operations per second.

While we'd like to use the powers of this system to figure out next week's Lotto numbers, Japan has more humanitarian purposes in mind, including simulating climate change and figuring out how new drugs will behave.

\$1 million Coke can zapping genius

If you could somehow muster an electric charge that was four times as powerful as all of the electricity on the planet Earth, how would you use your new-found powers? You could always give a workmate the world's biggest zap, but that would require a whole lot of effort shuffling around the office carpet.

The Los Alamos National Laboratory found a much more constructive use for this super charge – vaporising an aluminium can. While the charge only lasted a few millionths of a second, and cost approximately one million US dollars to create, the results were nothing less than... spectacular. In an aluminium can crushing kind of way, that is. According to an official who was involved with the experiment, the current caused the can to "implode at extreme speeds, with unrivalled symmetry, precision and reproducibility." Certainly beats slamming it against your forehead. While this kind of current would be perfect for getting a PowerPC CPU to finally run at 3GHz, the experiment was actually used to determine whether computer predictions of nuclear explosions are accurate.

It's still quite a way off though, with completion of the computer scheduled for 2011. It will utilise a hybrid computer design, making use of several different processor architectures, each focusing on specialised functions.

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UPDATE+++

Podcasting next on trial?

■ Podcasting could be next in the sights of music industry legal eagles. And if not, there will be a queue of pirates and software developers demanding

to know why. The legal case against MP3 favourites Napster, Kazaa and BitTorrent has always been that, although these programs don't breach copyright in themselves, they make it easy for others to do so. Now Apple has built podcasting capabilities directly into iTunes, that puts it on a par with pirate favourites like Kazaa.

Staying legal

■ Podcasting works by allowing users to download other people's broadcasts or playlists to replay at their leisure on their iPod. Legitimate broadcasters like the ABC have foreseen the legal copyright implications and only podcast their own self-generated content which usually just means chat minus any copyright protected music. But others could equally podcast their favourite songs. Suddenly podcasting becomes a warez pirates' tool.

'No comment'

■ An Australian Apple spokesman had no comment on the legalities of podcasting via iTunes. A legal defence that podcasting has legitimate uses beyond piracy could work - but if the music industry accepts that, it will set a precedent for P2P developers to hide behind if (or when) legal action begins against them. BitTorrent is a viable product for more than just downloading warez, just like iTunes and podcasting. It will be interesting to see how this one plays out, especially given iTunes market share of online music sales. Will that be enough to protect Apple?



ACSVIEW

Copyright's future

Edward Mandla looks into his crystal ball and finds it's foggy where copyright is concerned.

When you transfer your songs from a legitimately bought CD to a portable music player like an iPod, you are committing a crime punishable by heavy fines and/or a prison sentence.

Under Australia's current copyright laws, it is also illegal to tape a song from the radio or make a backup of your CD or DVD. It is illegal to convert legitimately bought videos to DVD. It is illegal to convert legitimately bought vinyl records to CD. It is illegal to copy songs from a legitimately bought CD, video or DVD to your PC. Some still argue that it is illegal to set your video recorder to tape your favourite TV show.

Since the Copyright Act 1968 was originally enacted, it has become increasingly more difficult for lawyers and judges to keep up with the changing pace of technology.

The legal principles are really very simple: copyright protects the work of the person/people whose blood sweat and tears created it from being sold on without compensation.

UNFAIR 'FAIR DEALING'

Until now, the Federal Government and the Courts have dealt with copying copyrighted material by turning a blind eye if the copying is for personal use. However, the entertainment industry has gone on record saying it is no longer willing to allow even this. Court action against people who have downloaded copyrighted material from the Internet seems to have become a weekly event.

The Federal Government is currently reviewing the 'fair dealing' provisions of the Copyright Act to determine



▲ You might own the CDs and DVDs, but you don't own the content under current copyright laws.

whether conduct which is neutral so far as the copyright owner is concerned should be permitted. This should mean that, provided one copy of content is legitimately received or obtained by a user, whether over free-to-air TV, cable TV, on DVD or CD, or radio, then when, where and by what means the user chooses to enjoy that content should not be affected by the Copyright Act.

The review is mainly concerned to compare the Fair Dealing provisions in Australia with the Fair Use principles that exist in US copyright law.

Fair dealing needs to be extended to include many more kinds of personal use. This would mean that you could record a TV show from a free-to-air station or a song from a free-to-air radio station without violating the Copyright Act, but you would be in violation if you acquired the copyrighted material from a rented or borrowed DVD, or sold it or shared it with others without the copyright owner's permission.

Fair dealing should also allow the purchaser of copyrighted material to access it in whatever medium they prefer. So after buying a CD, you should be allowed to listen to it in your car CD, on your PC, your sound system or on a portable player like an iPod. You should also be allowed to convert your old vinyl records and videotapes to digital media format.

Continually suing people for downloading a song off the Internet is not going to solve the problems within the entertainment industry. The Government needs to bring copyright laws into line with the needs of consumers, balancing the legitimate interests of copyright owners and their licensees.



Edward Mandla is national president of the Australian Computer Society. See www.acs.org.au for more info.

'Some still argue that it is illegal to set your video recorder to tape your favourite TV show.'

Some would argue the quality of some TV shows is even more criminal, however.

Tai-Chi

Thermaltake

the Next Generation PC ...

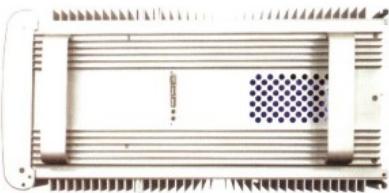


the Aluminum Extrusion Case with Liquid Cooling System

- Liquid cooling system application



- the Aluminum Extrusion Case



Model	Tai-Chi --- VB5000SNA
Case Type	Super Tower
Net Weight	17.1 Kg
Dimension	600 x 263 x 546 mm (H*W*D)
Cooling System	<ul style="list-style-type: none"> Front (intake) : 120 x 120 x25 mm blue LED fan, 1300rpm, 17dBA, Rear (Exhaust) : 120 x 120 x25 mm blue LED fan, 1300rpm 17dBA.
Drive Bays	11
-Front Accessible	Up to 10 x 5.25", 1 x 3.5"
-Internal	3 x 3.5"
Material	Aluminum Extrusion
color	Silver & Black
Expansion Slots	7
Motherboards	Micro ATX, ATX, Extend ATX, BTX, Micro BTX, Pico BTX
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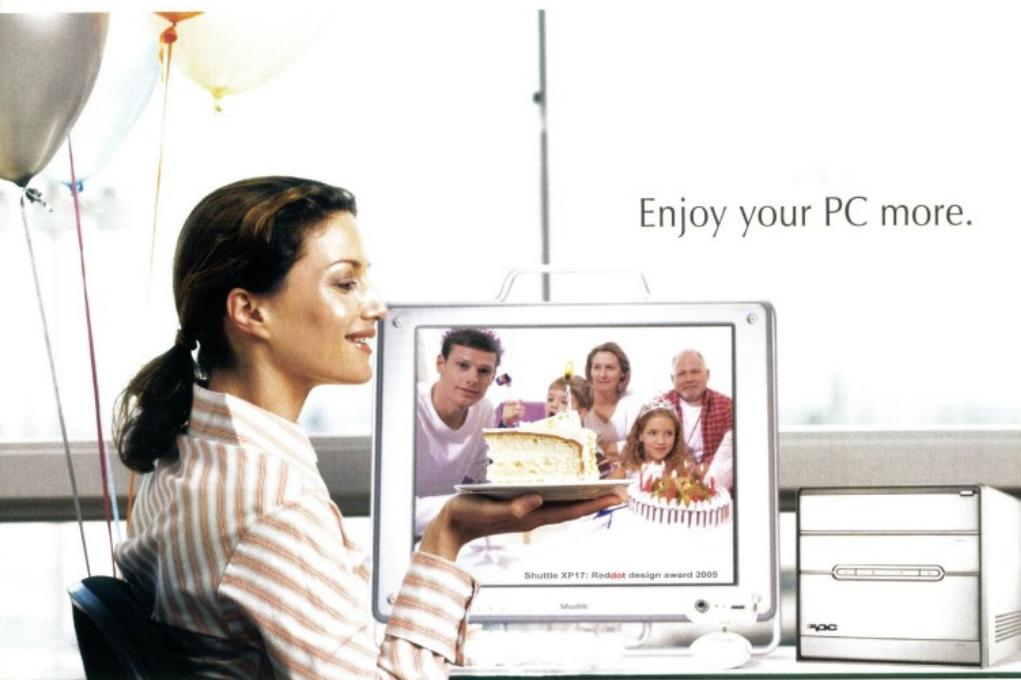
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Crazy browsers

The browser wars are on and Tim Dean feels like he's been caught in the crossfire.

I don't ask much from my Web browser. At least I didn't think I asked much from my Web browser, until I started using Firefox. Now, I know this is a risky thing to say – and it does feel like I'm making a dangerous confession here – but I've only just switched to using Firefox as my default browser instead of Internet Explorer. There. It's out.

The truly obscene thing is my browser of choice until I finally nailed Firefox was an Internet Explorer wrapper called Crazy Browser. Crazy Browser clearly has a stupid name, but it has an uncanny list of features that just happened to suit (many of) my needs in a browser. Most importantly, it has tabs – the most significant development in browsers over the past five years, and the feature that has been singularly overlooked by Microsoft for Internet Explorer.

I acknowledge that tabs make the browser interface more complex, and this was my main complaint about Firefox. For me, tabs are a way of streamlining my browsing behaviour. For example, I like to start the day perusing Google News. I scan the main page, and open maybe a dozen stories in new tabs in the background. By the time I've finished scanning the front page, the first stories have completed loading, so I move to them then work my way back. In order to make this work smoothly, I need new tabs to open immediately to the right of the source tab without stealing focus.

This is also complicated by the fact I usually have about 10 other tabs open at all times, and I like these tabs to open up automatically whenever I fire up my browser in the morning.



With 75 million downloads already, Firefox is taking over the world. Tomorrow, the universe?

So, if Google News is my first tab on the far left, I don't want the stories opening in new tabs on the end of the list at the far right. Also, when I close a tab I don't want it to always jump back to the first tab on the far left, I want it to shift focus just one tab to the left. I also want to be able to drag to reorder them, close them with my middle mouse button, etc.

PLUG-IN HELL

My preferences won't be the same as other people's, and this is why a tabbed browser needs a comprehensive and intuitive options window. And this is what Firefox lacks. Sure, there are plenty of great plugins for Firefox, some of which did what I wanted, but this very flexibility proved to be Firefox's shortcoming for me.

First I had to find the plugins. Then I had to decipher their poorly written descriptions and options menus. Then some of them had overlapping features that conflicted.



IE hits back

Despite the millions of Firefox downloads worldwide, Microsoft's Internet Explorer staged a small revival in July and clawed back some market share at Firefox's expense. The difference was just a fraction of one percent, but it marked the first time IE had made a gain since Firefox's v1.0 was launched last year.

Beta by far?

Microsoft's main weapon against Firefox and its other rivals will be IE7, the latest version of the browser. Initially intended to be launched with Longhorn, its development team has quite obviously pushed ahead while Longhorn's stalled. A beta version has been released and was leaked almost immediately.

Tab to the future

As expected, it features tabs to bring IE into the 21st Century (at last) but also has a very Firefox-looking Google query bar, plus live RSS feed linking. For a beta 1 version, it is surprisingly stable and fast. However, it lacks Firefox's plug-in adaptability.

Genuine users only?

MS has tied in the IE7 beta to its new Genuine Windows Validation program which automatically checks your XP isn't pirated before allowing you access to the beta (or indeed, general Windows updates). It was hacked within minutes of its release.



'Tabs make the browser interface more complex, and this was my main complaint about Firefox.'

Is adding advanced functionality while maintaining simplicity the final frontier for developers?

Get in touch

Send details of news, new products or technologies to techdesk@pcauthority.com.au

VISTA OF SECRECY

Windows Vista will have one of the most robust implementations of DRM ever. Tim Dean just wonders if it'll even work.

DRM (Digital Rights Management) is a woolly issue at best, a mammoth issue at worst, and the coming convergence between the IT and traditional consumer electronics spheres is making it even more curly.

On one hand you have the content providers who want to make sure their investments are protected and that people pay for what they consume. On the other hand you have the consumer, who for the most part is happy to pay for what they consume, but who doesn't want barriers placed in the way of them doing so.

In the past this was not an insurmountable issue. Macrovision is a good example of a technology that effectively protected content from copying, but didn't negatively impact most consumers. If you tried hard enough, you could circumvent it, but it was neither easy nor cheap to do so.

However, when you bring the PC into the picture, it's a very different story. Unlike your average set top DVD player, a PC is not a closed box – in fact, its strength lies in its open and modular nature, which can be configured for many different tasks. Furthermore, the controlling software (or firmware) on a DVD player is typically inaccessible to the end user, while a PC has a wide open operating system that makes it easy for users to install, or even write, any software they want. This makes the PC the equivalent of a leaky sieve in terms of protecting content.

In Microsoft's opinion, content providers will not be inclined to deliver content to the PC unless they are assured it will be protected from theft. If this is the case, 'there will be reduced demand for new content or new hardware to play content', according to a Microsoft white paper.

In order to protect content on a PC you need something a lot more extensive than just Macrovision. It has to cover everything including the media, the application and the operating system, the drivers and the hardware – all under one blanket scheme that interoperates seamlessly. And this is just what Microsoft has in mind for Windows Vista.

The question is, will it work? Furthermore, even if it does, will it disrupt end users to the point that they might be inclined to switch off?

THE SAFE PATH

There are two technologies being proposed by Microsoft for Vista: PVP (Protected Video Path); and PAPP (Protected Audio Path). They both use somewhat similar techniques, so we'll focus on PVP here to see how they work.

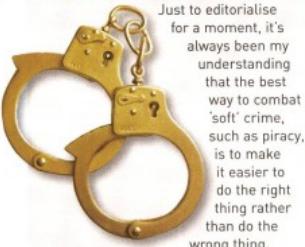
The idea behind PVP is there is a chain of security going all the way from the media to the

output device, whether that be a computer monitor, projector, television etc. If any part of the chain is broken, or doesn't comply with security levels, then the content will either not run or it will be downsampled, so high definition will end up looking no better than a DVX.

The system is designed to combat both 'software attacks' and 'hardware output attacks' (Microsoft's words) – which basically means either installing some kind of application to decrypt or copy the content, or introducing some hardware device, like a capture card or plugging your PC's output into another DVD recorder.

At the top level is PVP-OPM (PVP-Output Protection Management). Using this system, the

POLICE STATE

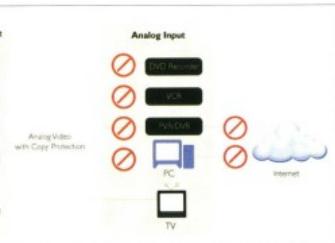


Just to editorialise for a moment, it's always been my understanding that the best way to combat 'soft' crime, such as piracy, is to make it easier to do the right thing rather than do the wrong thing.

Basically, human beings have always had the tendency to do things the easiest way they know how, and will employ surprising cunning and tenacity at doing so – arguably it's this very trait that has brought us from a few thousand bipedal simians trundling through the north African savannas to being the dominant species on the planet today.

If there are several possible ways of doing something, and you place barriers along one route, people will tend towards the other – such as downloading pirated music instead of paying for it.

This doesn't always mean people are predisposed only to the shady side of the fence. iTunes is a perfect example of this. For many people, iTunes is easier than



Macrovision works by plugging the digital and analog 'holes' from your DVD player. The illustration here shows how a Macrovision signal is prevented from going to a recording device.

content must be played using an authorised media player that contains the right security features and is recognised as such by Vista. This goes to the extent that if a 'rogue program' is installed, which could be anything from another media player,

even the likes of Kazaa, because they are guaranteed a clean, ordered and efficient search and download and a high quality file – something most peer-to-peer applications can't guarantee.

Then we have the prospect of PVP-OPM, which risks making it harder to do the right thing by trying to make it even harder to do the wrong thing. This is instead of the iTunes approach, which is to make it easier to do the right thing, even if in doing so it also makes it easier to do the wrong thing – the iTunes songs that do get cracked and end up on peer-to-peer certainly don't seem to be dampening iTunes's success.

For this reason, I have a hunch that most people won't bother paying extra time and money for a PVP-compliant PC, and they'll just pass on the 'premium content' that requires it. This may even have the further side effect of encouraging more pirated content, as pirates could quickly discover a growing audience of end users with an appetite for content, and no way to get it without spending big on PVP-compliant hardware. If this happens, then PVP will have backfired on Microsoft and the content providers. Thankfully, PVP is still in the planning stages, so hopefully Microsoft will see sense and find a way to protect content without it costing the end user.

ripper, or any software that is not recognised by Vista, the content will stop and will be disabled until the rogue program has been removed.

The next phase is to protect from 'hardware attacks' by the OS ensuring that all hardware is certified as supporting the required security features. This means the graphics hardware needs to be PVP-OPM-compliant, and Microsoft is depending on manufacturers to do quite a bit of work to make their graphics cards secure.

Compliant graphics cards need to have OPM on each output, which means using something like Macrovision for analogue outputs, such as VGA and S-Video, and HDCP (High Bandwidth Digital Content Protection) on digital outputs, like DVI. Cards should also include a constrictor, which is a devous little device that will downscale and then re-upscale high definition content in the case that the output is unprotected.

Furthermore, the output device, such as your monitor or television, needs to be OPM-compliant as well. If not, then the content either won't run or will be downscaled.

DESIGNATED DRIVER

The card's driver also needs to be trusted to tell the operating system whether the card is compliant. The danger is a 'rogue' driver will emulate certified hardware and will let the content through without protecting it. This is easier said than done, and Microsoft has had to resort to a fairly complicated system called HFS (Hardware Functionality Scan).

HFS needs to be able to uniquely identify the graphics hardware, and it does this via a very rigorous test. The trick is to challenge the GPU (Graphics Processing Unit) in such a way as it can answer the challenge with a unique response depending on the hardware. Microsoft is relying on the hardware manufacturers themselves to come up with this test based on the intricacies and idiosyncrasies of their hardware. For example, the test might involve using the GPU's texture

'In order to protect content on a PC you need something a lot more extensive than just Macrovision... And this is just what Microsoft has in mind for Windows Vista.'

shaders to perform a relatively complex shading operation and report back on the pixels. Each GPU will render this slightly differently, so it could be a good way of identifying each different GPU.

However, then it's the driver's turn to verify the response from the hardware, and this could be a bit problematic. There are two options for verification: a look up table of possible results for each different GPU; or the driver can actually emulate the same challenge in software. If the former is used, the risk is the look up table will quickly blow out as new GPUs are released. If the latter is used, it could take a considerable amount of time for the generalised CPU to emulate the specialised number crunching hardware of the GPU. Finally, the result needs to be encrypted

JARGON BUSTER

AES [Advanced Encryption Standard]: A strong encryption algorithm originally developed for the US government and in widespread use these days.

DVI [Digital Visual Interface]: A popular digital output often used to connect the graphics card to an LCD or plasma display.

HDCP [High-bandwidth Digital Content Protection]: An encryption standard developed by Intel to protect content running over digital outputs, like DVI.

HFS [Hardware Functionality Scan]: A feature of PVP-OPM that validates the graphics card and its driver as being certified and secure.

PAP [Protected Audio Path]: Similar to PVP, but protecting 'premium' audio content instead of video.

PCI-E [PCI Express]: A new serial high bandwidth graphics card interface.

PVP-OPM [Protected Video Path – Output Protection Management]: The security system that prevents 'premium' content from being leaked either from the operating system or the video output.

PVP-UAB [Protected Video Path – User-Accessible Bus]: The system that prevents interception of 'premium content' from a user-accessible bus like PCI-E.

SAP [Secure Audio Path]: The content protection system for audio currently implemented in Windows XP, but so far unused by most content providers.

to prevent other software from snooping it and emulating the hardware, which will also further tax system resources.

While this already places a great deal of responsibility on the hardware manufacturers, it gets worse. In the event that a driver is hacked, the hardware manufacturer needs to revoke the driver and release a new one. The question is how this could be enforced, as there'll be little incentive for most people to download a new driver that only plugs the hack. This could end up with Microsoft revoking the driver certificate in a future patch, or even preventing the driver from functioning in Vista all together – again not an easy thing to do.

encryption alone, let alone the resources needed to render the content.

The encryption also needs to be kicked into gear using a massive 2048-bit hash every time the system boots. Even using high powered GPUs, this could take up to a couple of seconds every time you boot your PC.

Then there's the issue of cards that have low amounts of memory on board and rely on swapping to the main system memory in order to function. Needless to say, this path will also need to be encrypted, taxing the system even further.

THE WEAKEST LINK

As you can see, PVP is a very comprehensive system that protects every possible entry and exit point of the PC from content 'leakage'. However, the big question is whether it will actually work? Furthermore, can Microsoft rely on the multitudinous hardware manufacturers out there to develop robust compliant drivers, and wear the cost of adding extra hardware components, like the constrictor and encryption chip? There's also a very high probability that at least one element of PVP will end up being hacked, and if that happens the whole system could well prove useless. Finally, it risks interfering with legitimate use of content if the user simply doesn't own PVP-OPM-compliant hardware, like the graphics card or television. In this case users could find themselves paying for high definition content that they can only watch at DVD resolution, or maybe not even watch at all.

WHAT DO YOU THINK?

Was this article helpful? Let us know at:
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to raise your eyebrows.



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INBOX

Got something to say? If you have a good story, an amusing anecdote or a tale of woe, we want to hear it!

CONTROL YOURSELF

In reply to H. Ammermann (*September 2005*) I would suggest to him that it is all a matter of getting from point A to point B.

One could go by public transport. The disadvantage is that one must go from the transport company's place of origin to their approximation of your destination and by their route. No expertise, knowledge of the route or ability with respect to control of the vehicle is necessary. This is pre-loaded Windows.

One could go by Taxi. This provides door to door capability and some control over the route. This is Windows with some independent third party facilities (eg FireFox, Thunderbird).

One could drive one's own car. This provides maximum flexibility in timing and route control but does require the ability to drive the vehicle and some knowledge of its mechanical workings is useful, of which these last two are acquired skills. This is Linux.

So long as one gets from A to B it does not really matter how one does it. For some of us the Linux route is more interesting and mentally challenging. Linux provides us with more control than does Windows and, as with anything else, the more one does for one's self the cheaper it is. Thus Linux rewards those who climb the steeper learning path by being more economical than Windows.

L Sharpe

'For some of us the Linux route is more interesting and mentally challenging. Linux provides us with more control than does Windows.'

HATE IS TOO STRONG

I am writing in response to H Ammermann's letter, No Support for Linux. I find it strange that at the very start of his letter he states that he hates Microsoft – hate is a strong word, and then in the very next paragraph is complaining that Linux is not more like Windows.

Mr Ammermann confesses himself that he is not a computer guru and so I wonder how someone of this level could hate Microsoft. I am guessing that it is caused by all the propaganda in

the media about the evils of MS. I am not defending one side or the other here. Microsoft sometimes has very questionable business practices and some of their software is terrible, however some of their software is world class and clearly the leader in that field.

As to questioning why the distributions come on ISOs is also unusual. It must also be remembered that Linux comes on many CD's due to the number of applications supplied with it, such as office apps and server products. ▶

STAR LETTER: New tech under threat

I wonder if the record and movie industries efforts to protect their property are going to prevent future media innovations from finding its way into households.

After purchasing my first couple of DVD-A albums I was interested to see what was happening in the area of being able to rip the tracks for use on a portable device.

It seems that the extra effort the industry has made to protect DVD-A's from being copied has been almost totally successful.

The one crude method used to circumvent the protection excited a lot of people and they stated boldly in forums that they were going out to buy their first DVD-A as a result.

I know many people who

chose to purchase one game console over another because you can copy games for it. They even state that feature when making arguments over which console is the best, and yet most of these people have never copied a game.

Recently I read that the Blu-ray Disc Association has agreed to add watermarking technology to the Blu-ray Disc specs. Many debates on internet forums about this announcement were from people who are unwilling to adopt a technology that will restrict how they use their purchased products.

I believe there are huge benefits to be found in a new audio and video media, but how does the industry expect to convert the rest of the population who are happy with



the quality of DVD and CD and appreciate being able to copy the media freely (although illegally). I think DVD-A is evidence of consumer's reluctance to adopt a new and more restrictive media format despite its benefits.

C Miles

This month's pick of the post wins a Galaxy 6600GT PCI-E Zalman Edition, worth \$250. This speedy card uses Zalman cooling and bundles in dual digital outputs and high definition TV out. Thanks to Australian Computer Direct for this awesome prize, and for more information head to www.computerdirect.com.au.

'If Windows was bundled with a few hundred applications it would come on multiple CD's as well...'

If Windows was bundled with a few hundred applications it would come on multiple CD's as well. Linux can be as big or small as you need it.

I use both MS and Nix in day-to-day work and both have a place and both do different things better than the other, you shouldn't hate one or the other for no good reason.

C Preston

WAKE UP!

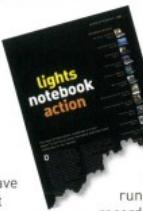
I've read your review on Samsung M40 [Multimedia notebook roundup, August 2005, page 59] and was totally appalled by it. To start off, it was too brief and looked at the 'game' side. Now, since Samsung clearly states in its websites that it's for the ultimate business notebook, I think you really didn't have a clue. As well, M40's brightest feature, the slimness and its 2.99 kg weight had been completely ignored - hey, if they make a notebook that's about the size of a desktop and weighs about 20kg, but has the best gaming system, I bet you'll give them 200 for your rating! Wake up, dude.

J R Hee

David Kidd replies: This roundup, like all our Labs comparisons, challenges a group of products on their ability to satisfy the criteria that's set by us. In this instance, it was multimedia and gaming, of which Samsung's slim M40 didn't perform as favourably as the others. All vendors are in control over which products they submit, and our judging criteria is made explicit to all-comers.

I WANT MY MCE

It is now almost 12 months since I was eagerly awaiting the arrival in Australia of Microsoft's XP Media Centre Edition. Here, I thought, would be a product that would meet my requirements exactly. Our household is fairly devoid of up-to-date entertainment equipment so I wanted to purchase devices that would allow me to play CD music and DVD movies, record TV programs and burn my digital home videos to DVD. My PC is getting on a little, so a new PC



with a reasonable video card was also being considered. Why not, I thought, combine all these features into one piece of equipment?

A small form factor

PC sitting with the TV and running XP MCE, two TV tuners [for recording one show while watching another], a good video and sound card [for gaming], a wireless network card [to link with my existing PC] and a CD/DVD burner seemed the ideal solution to all my requirements. I've been searching since MCE was released and, while it is possible to satisfy some of these requirements, I have yet to find anything that contains all these features and will deliver a seamless, easy to use solution. Does such a thing exist?

J Vanders

Nick Ross replies: The first wave of media PCs resulted in disappointing hybrids that resembled a traditional desktop, rather than a piece of lounge room hardware. Our A-listed Maestro from Atelch is the first one that really nailed it, but stay tuned next month as we round up the latest units on the market. ■



GETTING IN TOUCH

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Please limit letters to 200 words. PC Authority extends a hearty congratulations to this month's competition winners. We've had a tremendous response to our competitions, and we'll be sure to keep the prizes coming.

COMPETITION WINNERS

SmartyHost: H Siegl; D Hart; L Yeung; P Yandle; D Beckett.

The biggest range of MFD's gives your office greater flexibility of choice.

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So if you're looking for the perfect fit for your office printing needs, look no further than Ricoh. Contact Ricoh on 1800 181 002 or visit ricoh.com.au/smarterofficecolour

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AF3245C-35/45ppm



AF3260C-45/60ppm



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THE INVESTIGATOR

What happens when a retailer mistakenly advertises a product at a fraction of the proper price as Dell did recently when it offered hard drives for \$8.80? **David Hellaby** investigates.

Early in August many consumers around the country thought they had hit the jackpot. Dell was advertising 250GB Serial ATA II hard drives for just \$8.80 each. Word spread rapidly and Dell was flooded with orders – some for hundreds of units.

Many people had their orders processed and received emails confirming their purchase. However, the price was a mistake and Dell immediately sought to cancel the orders. It contacted purchasers, informed them of the error and offered them the hard drives at the proper price of \$262.90.

Offices of Fair Trading around the

A FAIR TRADE?

According to a spokesman for the NSW Office of Fair Trading:

'If there is an offer, an acceptance and a consideration – in other words Dell advertises the product at a price, someone orders and pays for it and Dell banks the money – then there is a contract.'

'If Dell does not produce the goods the consumer can take the matter to the Consumer Trader and Tenancy Tribunal in New South Wales or the equivalent tribunal in their home state.'

'If the payment has not been banked the consumer may still have a claim, however;

LEGAL OBLIGATIONS

Dell said while it believes many customers would have understood the \$8.80 price was an error it will fulfil confirmed orders for which payment had been received and it is satisfied the hard drives are for personal use.

A Dell spokesman said about 10 percent of the orders received would be fulfilled.

'It is a relatively small number. As soon as the error was identified we began contacting customers who may have unknowingly sought to place an order at the incorrect price. While we made it a priority to contact customers directly, we apologise for any inconvenience or confusion that may have been caused. We advised these customers of the error and offered to either cancel the order or obtain their individual authorisation to proceed with the sale at the correct price. Dell intends to fulfil our legal obligations and will not charge the correct price, nor refund, without clear authorisation from the customer. We ask any customer who feels they had an order cancelled or payment refunded without authorisation to contact us.'

NOTE: When asked for the correct price, Dell told us it was \$599 (expensive for a 250GB hard drive). It was listed in a newspaper as being \$529, however, Dell's website was advertising the offending drive at \$262.90. What's the correct price? We're guessing it's somewhere between \$8.80 and \$600.

'Word spread rapidly and Dell was flooded with orders – some for hundreds of units.'

country soon began receiving complaints. After all, orders had been placed and accepted, they had been confirmed by email and credit card details had been provided.

Dell began discussions with the New South Wales Office of Fair Trading and other authorities to clarify the situation and try to reach some form of agreement as to how to handle the situation. Those discussions were continuing when we went to press, however, Dell says some people will receive their \$8.80 hard drives.

HERE TO HELP

We welcome consumer complaints and questions, and we'll do our best to help find a solution for all parties involved. If you're the victim of poor sales, dodgy service or any other kind of dispute, we need to hear about it. If you'd like our help, email us at: investigator@pcauthority.com.au.

Please note that the companies or individuals mentioned here are meant to illustrate the typical problems that an ordinary consumer could face. If a company is mentioned here it should not be taken as an indication that incidents described are typical of that particular company.

Please don't use the PC Authority or The Investigator name as leverage to get more than you are entitled to.

their case will not be as strong because while they might have provided their credit card details, the contract is not considered complete until the payment is processed and comes up on the consumer's credit card statement,' said the spokesman.

Anyone who ordered bulk quantities of the hard drives has little chance of getting the goods because it is a standard condition of Dell's Terms of Sale that items cannot be purchased for resale and the purchaser would have to prove that all the drives they ordered were for personal use, which would be somewhat difficult.



▲ A SATA II drive for nine bucks? Where do I sign!

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RRP from
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- 802.11b/g Wireless, Card Reader, Remote

- Entertainment Server
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- HDTV Tuner
- SD/HD Digital TV
- DVD/MP4 Player
- MP3/CD Player
- Free EPG
- Gaming Console
- Media Broadcasting
- Wireless Keyboard/Mouse

- Intel Pentium 4 with HT Technology
- Up to 2GB 400MHz DDR RAM
- Up to 64MB Shared Graphics
- 17" SXGA+ 1280x1024 TFT Screen
- Choice of 24x CD-Rom
- OR 8x DVD/24x CD-RW OR 8x DVD+/-RW DL
- Ultra-ATA Hard Drive, Firewire
- Windows XP Home/Professional

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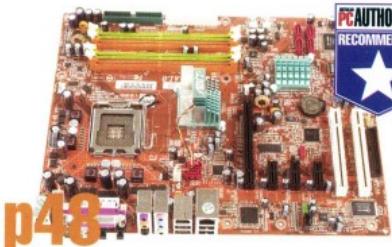
Wireless connectivity and some features may require you to purchase additional software, services or external hardware. Availability of public wireless LAN access points limited. System performance measured by MobileMark® 2002. System performance, battery life, wireless performance and functionality will vary depending on your specific hardware and software configurations.

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THE A-LIST

Only the absolute best of the best make it to *PC Authority's* A-List.

INTEL MOTHERBOARD



Abit AL8

PRICE: \$269

SUPPLIER: Altech (02) 9735 5655

ISSUE: Recommended, October 2005, page 48



NEW

MID RANGE PC



Dell Dimension 9100

PRICE: \$2699

SUPPLIER: Dell 1800 812 393

ISSUE: Recommended, October 2005, page 44



NEW

BUSINESS PC



p57

Dell Optiplex GX620 USFF

PRICE: \$1439

SUPPLIER: Dell 1800 812 393

ISSUE: Recommended, October 2005, page 57

NEW

ULTRAPORTABLE LAPTOP



p40

Lenovo ThinkPad X41

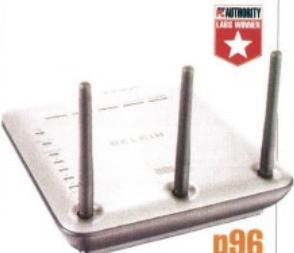
PRICE: \$3649

SUPPLIER: Lenovo 1300 557 073

ISSUE: Recommended, October 2005, page 40

NEW

MIMO ROUTER



p96

Belkin Wireless Pre-N

PRICE: \$262

SUPPLIER: www.gennix.net.au

ISSUE: Labs Winner, October 2005, page 96

NEW

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COMPACT CAMERA (7-8MP)



Samsung Digimax V700

PRICE: \$899

SUPPLIER: Adeal [03] 9369 4444

ISSUE: Labs Winner, June 2005, page 72

COMPACT CAMERA



Canon Ixus 50

NEW

PRICE: \$673

SUPPLIER: Road Mogul [03] 9221 0873

ISSUE: Recommended, October 2005, page 63

MEDIA PC



Altech Maestro Pro

PRICE: \$2899

SUPPLIER: Altech [02] 9735 5655

ISSUE: Recommended, September 2005, page 44

ENTERTAINMENT NOTEBOOK



ITC Millenia 7350

PRICE: \$5499

SUPPLIER: ITC [08] 9486 7166

ISSUE: Recommended, September 2005, page 43

PERFORMANCE GRAPHICS



Albatron 7800GT

NEW

PRICE: \$639

SUPPLIER: Netac [02] 9212 6686

ISSUE: Recommended, October 2005, page 52

INTERNAL HARD DISK



Maxtor DiamondMax 10

PRICE: \$173

SUPPLIER: Maxtor [02] 29369 6622

ISSUE: Labs Winner, July 2005, page 90

SOUND CARD



**Creative Sound Blaster
Audigy 2 ZS Platinum Edition**

PRICE: \$499

SUPPLIER: Creative [02] 9021 9800

ISSUE: Labs Winner, November 2004, page 75

DVD BURNER



LG GSA4120B

PRICE: \$369

SUPPLIER: LG Electronics 1800 643 156

ISSUE: Labs Winner, February 2005, page 87

COLOUR LASER PRINTER

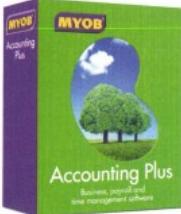
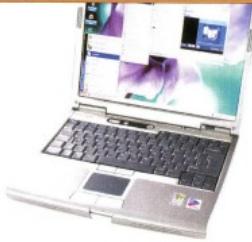


Kyocera Mita FS-C5016N

PRICE: \$3848

SUPPLIER: Kyocera Mita 1300 364 429

ISSUE: Labs Winner, April 2005, page 64

MP3 PLAYER**Rio Carbon 5GB****PRICE:** \$420**SUPPLIER:** Expansys (03) 8415 0848**ISSUE:** Labs Winner, August 2005, page 84**ACCOUNTING****MYOB Accounting Plus v15****PRICE:** \$595**SUPPLIER:** MYOB 1300 555 111**ISSUE:** Recommended, July 2005, page 54**MULTIFUNCTION PRINTER****Canon PIXMA MP780****PRICE:** \$599**SUPPLIER:** Canon (02) 9805 2000**ISSUE:** Labs Winner, May 2005, page 90**LCD SCREEN****Viewsonic VX924****PRICE:** \$899**SUPPLIER:** Viewsonic (02) 9906 6277**ISSUE:** Labs Winner, September 2005, page 64**BUDGET PROJECTOR****Hitachi PJ-TX10****PRICE:** \$1899**SUPPLIER:** Hitachi 1800 032 689**ISSUE:** Labs Winner, July 2005, page 74**BUSINESS NOTEBOOK****Dell D610****PRICE:** \$3032**SUPPLIER:** Dell 1800 812 393**ISSUE:** Recommended, September 2005, page 38**WEB BROWSER****Mozilla Firefox 1****PRICE:** FREE**SUPPLIER:** Mozilla.org**ISSUE:** Recommended, March 2005, page 50**MID-RANGE GRAPHICS CARD****GeCube RADEON X800XL D3****PRICE:** \$423.50**SUPPLIER:** Kingmax (02) 9648 4658**ISSUE:** Recommended, September 2005, page 56**INTERNET SECURITY SUITE****F-Secure Internet Security 2005****PRICE:** \$125.28 for first year; \$87.80 thereafter**SUPPLIER:** Open Systems (02) 6261 4900**ISSUE:** Labs Winner, April 2005, page 79

A-List: Upgrade Guide

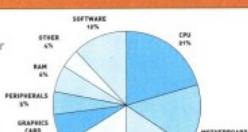
While our A-listed products give a good summary of individual products, we recognise that many users have different requirements, especially in the case of components. We've broken down the most common areas that PC builders will look at when upgrading their PCs and assigned target prices for each category. Home users or those after a basic workhorse system will find the budget PC to better cater for their needs; business users will find a more comprehensive setup in the mid-range; and those after a top performer for games or digital creation will find the performance PC to their liking.

BUDGET PC

Last month we managed some massive upgrades but went \$48 over our limit. This month's tweaks were more modest and we just managed to stay under budget.

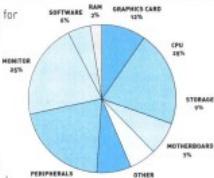
We still can't move to PCI-E as the jump in graphics card prices is large, but we did add RAID to our specs.

Processor, monitor and operating system all saw minor price drops but the only real excitement came from an LG DVD writer which offered 16x DVD+R writing, 4x DVD+R9 dual layer writing as well as DVD-RAM compatibility. At just \$79 and with forecasts of sharp drops still to come, everybody now can afford a seriously DVD writer.



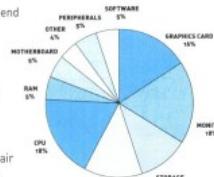
MD-RANGE PC

Price drops were much more significant for our mid-range system. In fact the case, motherboard and hard disk saved over \$200 in total. We used the same excellent LG optical drive from the budget system and the Viewsonic's 19in 12ms LCD monitor price dropped even more. We were already happy with most parts of this system so we splashed out on one major upgrade – our processor moved from an Athlon 64 3200+ to a super fast dual core Athlon 64 3800+ which we found on sale for just \$510. Thus, this month's mid-range system becomes a powerful monster. We went \$44 over our limit, but it was well worth the extra this month.



PERFORMANCE PC

Prices continue to plummet for our top end system. Last month we made huge upgrades to our system, and while they're not so physically obvious this month, performance has rocketed. Our case has stayed the same, but we've moved onto an SLI motherboard and slotted in to it 1GB of performance Corsair memory. We've also moved up to a very powerful dual core processor in AMD's 4200+ chip and for graphics have added our newly A-Listed Albatron 7800GT graphics card. This system is flying. We came in \$300 under budget last month but have only managed \$89 under this month. But what a difference a month makes.



Budget PC

COMPONENT	DETAILS	TARGET SPECIFICATION	PRICE
• CASE	Midi tower	350W PSU; 3+ bays; front USB	\$45
• CPU	AMD Athlon 64	3000+, 1.8GHz 512KB L2 cache	\$209
• MOTHERBOARD	NVIDIA nForce3 chipset	AGP 8x; Gigabit Ethernet; RAID	\$137
• RAM	512MB PC3200 DDR	400MHz DDR SDRAM	\$64
• GRAPHICS CARD	RADEON 9550	AGP; 128MB DDR RAM	\$70
• MONITOR	17in CRT	1024 x 768 @ 85Hz minimum	\$156
• SOUND CARD	Integrated sound	Integrated in motherboard	\$0
• SPEAKERS	None	None	\$0
• HARD DISK	80GB PATA	7200rpm; Parallel ATA; 2MB cache	\$79
• OPTICAL DRIVE	DVD writer EIDE	16x DVD-RW; 4x DL; DVD-RAM DVD	\$79
• NETWORKING	Integrated 10/100/1000	Integrated in motherboard	\$0
• MOUSE	Basic mouse	Optical; 2-button; wheel; USB/PS/2	\$18
• KEYBOARD	Basic keyboard	104-key keyboard	\$12
• OPERATING SYSTEM	Windows	XP Home	\$124
• PERIPHERALS	N/A	None	\$0
• WARRANTY	Standard	3 years RTB	\$0
• Total			\$999

Mid-range PC

COMPONENT	DETAILS	TARGET SPECIFICATION	PRICE
• CASE	Midi tower	350W PSU; 4+ bays; front USB	\$135
• CPU	AMD Athlon 64	Athlon 64 3800+ dual core; 2GHz;	\$510
• MOTHERBOARD	nForce 4 chipset	2 x 512KB cache	
• RAM	512MB PC3200 DDR	400MHz DDR SDRAM	\$66
• GRAPHICS CARD	NVIDIA 6600GT	PCI Express; 128MB DDR RAM; VIVO	\$255
• MONITOR	19in LCD	1280 x 1024; 12ms	\$504
• SOUND CARD	Integrated sound	Integrated in motherboard	\$0
• SPEAKERS	2.1 speakers	2x 3W satellites; 1x 17W subwoofer	\$40
• HARD DISK	160GB SATA	7200rpm; Serial ATA; BMB cache	\$115
• OPTICAL DRIVE	DVD+-RW	16x DVD+/-R/RW dual layer	\$79
• MOUSE	Basic mouse	Optical; 2-button; wheel; USB/PS/2	\$16
• KEYBOARD	Enhanced keyboard	Ergonomic or extra functions	\$36
• OPERATING SYSTEM	Windows XP	Home Edition	\$124
• PERIPHERALS	N/A	None	\$0
• WARRANTY	Enhanced	3 years on-site same-day	\$0
• Total			\$994

Performance PC

COMPONENT	DETAILS	TARGET SPECIFICATION	PRICE
• CASE	Midi tower	350W+ PSU; 5+ bays; front USB	\$150
• CPU	AMD Athlon 64	3800+, 512KB L2 cache; 2.4GHz;	\$705
• MOTHERBOARD	NVIDIA nForce4 chipset	Dual channel DDR; 7.1 audio; USB 2.0; 2x Gigabit Ethernet; SATA RAID; 2x PCI Express	\$215
• RAM	1GB PC3200 DDR	2x 512MB 400MHz DDR	\$194
• GRAPHICS CARD	ATI RADEON X800 XL	PCI Express; 256MB DDR; VIVO	\$639
• MONITOR	19in LCD	1280 x 1024; 4ms	\$799
• SOUND CARD	7.1 PCI	24-bit; 7.1 output; EAX; breakaway box	\$295
• SPEAKERS	7.1 surround speakers	6x BW sat; 1x DOW centre; 2x W sub	\$196
• HARD DISK	2x 250GB SATA	7200rpm; ATA/100; 16MB cache	\$352
• OPTICAL DRIVE	DVD+-RW	16x DVD+/-R/RW dual layer	\$79
• NETWORKING	Integrated Gigabit Ethernet	Integrated in motherboard	\$0
• MOUSE	Laser mouse	Laser; wheel	\$91
• KEYBOARD	Enhanced keyboard	Ergonomic or extra functions	\$91
• OPERATING SYSTEM	Windows XP	Professional	\$195
• PERIPHERALS	Game device	Joystick/gamepad/wheel	\$0
• WARRANTY	Standard	3-years RTB	\$0
• Total			\$3911

Please note that prices are subject to change and you may find prices differ from your local retailer. As always, we recommend you shop around for the best deal and if you've found a bargain, let us know at: alist@pcauthority.com.au.

**CROSS
FIRE**



Radeon Xpress 200 Motherboard
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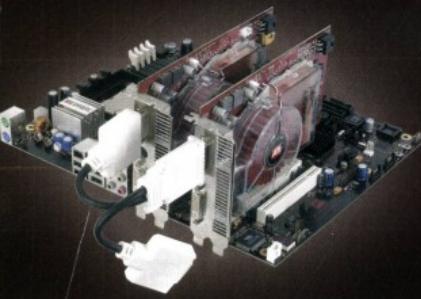
RADEON X850
or RADEON X800

II



CrossFire

MULTIPLY & CONQUER



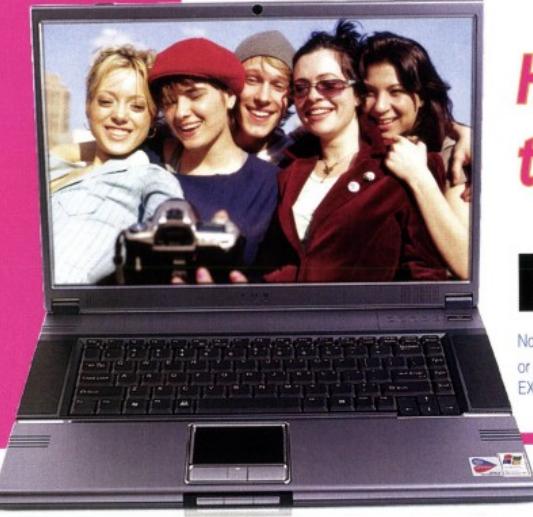
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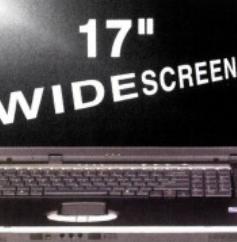
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Built-in Camera

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17"
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D495

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DVD Dual Drive
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256/512/1024 MB DDR Memory

40/60/80/100GB HDD

DVD Dual Drive

Windows® XP Home Edition



G556

Intel® Pentium® M 755 Processor 2.0 GHz
Intel® Celeron® M 340 Processor 1.5GHz
128MB ATI Radeon 9700 graphic
15.1" 1024x768 XGA display
256/512/1024 MB DDR Memory
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DVD Dual Drive
Windows® XP Home Edition

● **ALL ROUNDER**



D43EF

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256/512/1024MB DDR Memory
40/60/80/100GB HDD
Combo (DVD+CD-RW)/DVD Dual Drive
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IN THE LABS

Want the best advice on what to buy?

Check out what's been through our Labs this month.

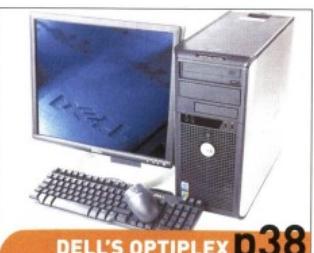
**[NO ONE TESTS TECH
LIKE PC AUTHORITY]**



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HOW WE TEST

Ever wondered which benchmarks we use to test the PCs, notebooks and peripherals?

THE BENCHMARKS



PCMark04

This strains and tests a machine's subsystems from CPU, RAM, HD and the whole.



3DMark03

An update to the benchmark, this version takes graphics performance to the next level.



3DMark2001 SE Pro

An old standard, this benchmark flogs a video card's DirectX 8.0 capabilities.



3DMark05

The hardest yet, '05 taxes even the most capable system. We've yet to see this run well.

MobileMark2002



Doom 3

An industry defining game, Doom 3 gives us a 'real-world' test of a system's capabilities.

MobileMark2002

We use this tough benchmark to strain a notebook and it's battery to the limit.

THE YARDSTICKS

The yardsticks are used to test the equipment we get in for review, and are also used as yardsticks to gauge the performance of the PCs and notebooks sent in to us. The technology in these is refreshed frequently, and a big thank you goes out to ASUS, Altech, ABIT, AMD, Achieva and Western Digital for supplying the hardware used in our testbenches.

System

AMD Athlon FX-55 2.6GHz; 1GB DDR200 RAM; ASUS AV8 Deluxe motherboard; 256MB RADEON X800XT Platinum Edition; 2x 120GB SATA HDDs; Windows XP Pro.

Notebook

AMD Athlon 64 3400+ 1.8GHz processor; 1GB DDR; 60GB HDD; ATI Mobility RADEON 9700 128MB graphics; Windows Media Center.

VIEW FROM THE LABS

What a month!

We've reviewed what is quite probably the fastest PC available anywhere in Altech's Zed Cryo. This sports AMD's new chip the FX 57. But Intel isn't lurking far away – we reviewed motherboards which support both the new NVIDIA SLI Intel Edition chipsets and dual-core CPUs. In the realm of laptops we've got two of the most portable and desirable models ever made in the Lenovo ThinkPad X41 and Toshiba R200. Both of which might represent incremental improvements, but they're worthy ones.

The graphics market seems to have gone mad. We've got a pre-overclocked 7800GTX (does it really need to be any faster?) and a brand new 7800GT chipset-based card. Could the latter be the chipset of choice for most enthusiasts from now on? NVIDIA has also announced improvements along the whole SLI line. Top-end motherboards will be able to run dual 16x configurations rather than having to assign 8x to each card – we won't see the benefit for some considerable time but the theoretical increase in bandwidth and processing power is immense. At the lower end of the market drivers have become available which allow low-end NVIDIA cards to run in SLI without using a bridge connector – the system bus is used instead. This month we see how Gigabyte has taken advantage of this by attaching two 6600 chips to one card to make the cheapest SLI setup available. Anyone remember ATI?

In our group tests we examine whether there is still any need for dedicated scanners. People may be wondering whether they're better off simply buying a MFD these days, but we show there's plenty of life in the machines yet.

Finally, there's our wireless router round up. If you've got broadband access these days then you'll probably need a wireless router to share a connection between two or more PCs or a laptop – no more unsightly or inconvenient wires. For those of you worried about neighbours stealing your precious (and usually hideously overpriced) connection we also tested everything using WPA security. Traditionally, people haven't liked the idea of wireless security as it's been a) fundamentally insecure and b) like a ball and chain to connection speeds. This month's test debunks that myth – the speed hit is negligible and security very tough.

But many people may find that the most interesting aspect of this month's labs is our new price policy. From now on we won't just be quoting RRP, but finding where you can buy the products and how much they really are going to cost you. This way, when we say that something is the cheapest card on the market, we mean it. There's more on this opposite and you'll be seeing many more exciting changes to come over the next few months.

NICK ROSS, LABS EDITOR

CHEAPEST PRICES!

From now on **PC Authority** will find you the cheapest prices of every product we review.

Traditionally in Australian computer magazines, the RRP of products has always been listed alongside the reviews. While this ensures that there's always a steady benchmark against which to compare products, there are problems with doing so.

For one thing, the value score of any review is based almost entirely on the decision of a few marketing executives. In reality, when you're out shopping whether on the Web or on the high street, you hardly ever see anything sold for the recommended retail price.

Every RRP includes an enormous amount of fail safes so that even a seller with a low supply of a product can make a decent



'We've contacted the 63 resellers on this list and printed the cheapest price we could find.'

margin (or profit) on goods they sell. However, many high street shops pay a fraction of the RRP when they buy the goods wholesale from a distributor. Some can even make over 50 percent profit on an item. This is why there are so very many sales, and shops can offer crazy half-price discounts just to shift old stock. You don't think they're making a loss do you?

For people reading a magazine review (especially a group test) it can be most confusing to read that one product is better than another because its RRP is cheaper and therefore the better buy, only to go down to the shops and see that someone is selling the more expensive product cheaper (probably because they have a better relationship and thus, a better supply, with the distributor).

Well to get rid of this problem, we're going to list the real prices that you can expect to pay for goods. When we say that a product is better because of its price – we'll prove it. For everything reviewed in this month's issue we've individually contacted the 63 resellers on this list and printed the cheapest price available in Australia. What's more, in some cases sellers are giving special discounts exclusively to *PC Authority* readers. Consequently, when you buy *PC Authority* from now on, you'll know that you'll get the cheapest prices around.

We're also going to be listing the price of delivery. After all, it's no good offering a cheap price only to make your margin by overcharging on courier fees. The reseller that sends us the cheapest overall prices gets listed. However, please note that some delivery charges can increase. We've tried to get a flat national rate wherever possible, but inevitably with the sheer size of Oz, getting to places that are off the beaten track is going to cost more – so our apologies, if this proves inconvenient. Finally, please note that all prices listed include GST and were correct at the time of going to press.

HOW TO PARTICIPATE

Do you have what it takes to participate in *PC Authority*'s cheapest price guide? To join up, and help us make our list even more exhaustive, send an email to
nross@pcauthority.com.au

ALTECH ZED CRYO

PRICE: \$6423 DELIVERY: \$65



LABS VERDICT

Obscenely fast, although some features could be better as could the noise.

Performance



Features



Value



OVERALL



Our poor receptionist didn't quite know what to do when Altech's monolithic machine turned up. She had a point. At 36kg and 56cm in height, this metal-cased behemoth is truly immense. The VapoChill Extreme Edition case is actually a midtower case with a refrigeration unit on top. A large rubber pipe leading down to the CPU and the machine physically jolts when you turn it on. It's just unfortunate that instead of a satisfying V8 growl, or more importantly, abject silence, several fans kick in giving a noisy, if constant drone.

'At 36kg and 56cm in height, this metal-cased behemoth is truly immense.'

Four 80GB Seagate Barracuda 7200.7 hard disks run in a RAID 0 array giving a formatted capacity of 298GB – disappointing considering the price. There are also two AvertVision 7800GTX graphics cards running in SLI mode, two 512MB sticks of speedy Corsair TWINX-3200XL and the piece de resistance, an Athlon FX-57 processor. The latter is AMD's fastest, non-dual core chip (see side bar). The extreme cooling is necessary as Altech has overclocked the 2.8GHz chip to 3.31GHz. All of this is plugged into a fine-tuned Abit AN8 SLI Fatal1ty nForce 4 Ultra motherboard and the whole system is monitored via the uGuru front panel which displays various system temperatures and fan speeds.

By scoring 61.38 PCMarks in PCMark 04, it can claim to be the fastest consumer PC on the market. Naturally, it's no slouch at 3D work



The behemoth frame makes its presence felt not just in size but in noise too.

either. It scored 12,227 and 10,786 3DMarks at 1280 x 1024 and 1600 x 1200 respectively in 3DMark 05. In our grueling real-world Far Cry tests it managed 82fps at 1280 x 1024 which dropped to 60fps when HDR was turned on. At 1600 x 1200 it managed 80fps

without HDR and 44fps with it.

Other features include a basic Microsoft keyboard and optical mouse set and only one modest 16x DVD+R, 2.4x DVD+R9 DL optical drive – a bit stingy considering the price paid. At least the Samsung Syncmaster 930BF (*September 2005, page 70*) monitor is a great performer. The display quality is top notch and the 4ms response time enforces the systems gaming pedigree.

However, the 1280 x 1024 native resolution throttles the 3D power making at least one 7800GTX redundant.

Connectivity comes at the front via the uGuru panel, which provides two USB 2, a FireWire, headphone and microphone ports. This also monitors temperatures and fan speeds. The covered button at the front is a bad inclusion though, as pressing it wipes your CMOS settings (losing the overclock and RAID information leaving you with a dead PC). There's also a riser for the six eight-channel audio connectors but unfortunately no speakers are included.

All in all it's a mighty machine, though having so much 3D power is wasted on a low resolution monitor. However, if money is no object and you want the ultimate gaming system with serious future headroom, this is it.

Nick Ross



FOCUS ON: FX-57

At 2.8GHz, the FX-57 has the highest clock speed yet of any Socket 939 AMD CPU, complete with 1MB of Level 2 cache. The new San Diego core also includes support for SSE3 [Streaming SIMD Extensions 3], enhancing CPU and RAM controller efficiency, as well as lowering power consumption requirements.

The San Diego core uses a smaller 90nm manufacturing process, so can squeeze more transistors onto a silicon wafer than the 130nm FX-55. Thanks to these smaller, lower capacitance parts, Thermal Design Power (TDP) stays at 10W. Current Socket 939 motherboards only need a BIOS update to work with the new FX-57. As with all FX chips, the core clock is unlocked and, thanks to the lower power consumption, should be capable of large overclocks.

The only caveat is that the FX-57 has one processing core. As the Unreal Tournament scores (see below) demonstrate, that's good news for older games that rely more heavily on a single CPU thread, but we'll see multicore-aware game engines soon, with AI, physics simulation and geometry creation farmed out to separate threads. A second core could also help to spread the load of your virus checker and personal firewall – particularly useful for online gamers.

SPECIFICATIONS

2.8GHz Athlon 64 FX-57 [running at 3.31GHz]; 1GB Corsair TWINX-3200XL RAM; Abit AN8 SLI Fatal1ty nForce 4 Ultra motherboard; 4 x Seagate Barracuda 7200.7 80GB hard disks; Samsung TS-H552B DVD writer; 2 x 7800GTX graphics cards; Gigabit Ethernet; Asetek VapoChill Extreme Edition case and cooling; Windows XP Pro SP2; 3yr RTB warranty.

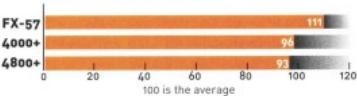
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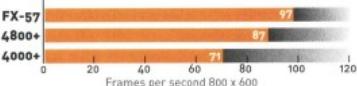
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BETTER ▶

2D PERFORMANCE



UNREAL TOURNAMENT 2004





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WARRANTY

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South Australia	08 8363 1011
Western Australia	08 9371 8600

Lenovo ThinkPad X41

PRICE: \$3649 DELIVERY: \$50



LABS VERDICT

Great build quality, a remarkably low weight and impressive battery life, but expensive.

Performance



Features



Value



OVERALL



While many ultraportable laptops, like the Toshiba R200 (see page 43) go all out to get size and weight to an absolute minimum, a great deal of usability is often sacrificed – the X505 is impractically small for constant daily usage while the R200 has limited battery sizes. The ThinkPad X40 offered an excellent keyboard, decent feature set and superb battery yet stayed small in size and weight making it an ideal all round portable.

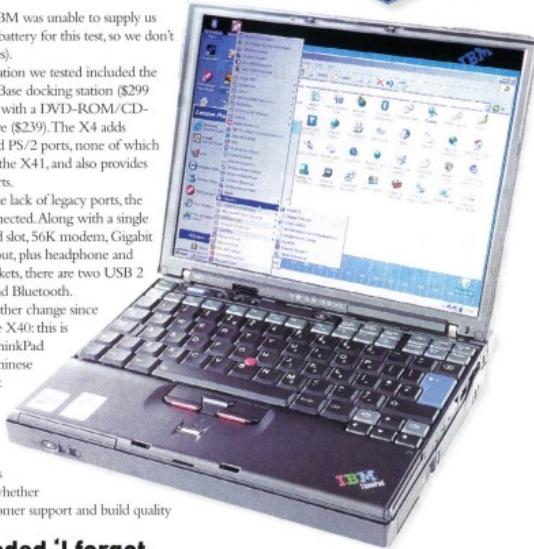
Now here's its successor, the Lenovo X41. Externally, there's only one real difference: there's a fingerprint reader just below the mouse buttons. It may seem like a minor step forward, but if you're rolling out this notebook to a team of users then it means you'll never need to have that dreaded 'I forgot my password' conversation again.

(unfortunately, IBM was unable to supply us with a four-cell battery for this test, so we don't have exact figures).

The configuration we tested included the handy X4 UltraBase docking station (\$299 extra), complete with a DVD-ROM/CD-RW combo drive (\$239). The X4 adds parallel, serial and PS/2 ports, none of which are included on the X41, and also provides three USB 2 ports.

Aside from the lack of legacy ports, the X41 is well connected. Along with a single Type II PC Card slot, 56K modem, Gigabit Ethernet, VGA out, plus headphone and microphone sockets, there are two USB 2 ports, infrared and Bluetooth.

There's one other change since the release of the X40: this is now an 'IBM' ThinkPad in name only: Chinese computing giant Lenovo now owns what was IBM's personal computer group. This raises questions over whether the level of customer support and build quality



▲ The Ultrabase docking station makes it easy to use the X41 as a main PC.

downside is that this disk image consumes disk space, with 51.9GB left from 60GB.

We're disappointed with the warranty: one year's return-to-base cover pales in comparison to the three years' on-site cover provided by the likes of Dell with its business notebooks. Then again, ThinkPads are less likely to need repairing than most notebooks.

With the single caveat of buying the eight-cell extended-life battery, we have no hesitation in placing the X41 on the A List: its combination of low weight, unrivalled build quality and data security make it the ideal ultraportable.

Tim Danton

SPECIFICATIONS

1.5GHz Pentium M 758 LV; 512MB PC2-4200 RAM; 60GB hard disk; Intel GMA 900 graphics; 12.1in 1024 x 768 TFT; 56K modem; infrared; Bluetooth; Gigabit Ethernet; 802.11a/b/g WLAN; 2 x USB 2; VGA; Type II PC Card slot; docking station with combo DVD-ROM/CD-RW drive; Windows XP Professional; 1yr RTB warranty. Dimensions: 268 x 211 x 21mm (WDH). Weight: 1.27kg [1.49kg with 8-cell battery]. Model code 25256NM

SUPPLIER

Lenovo 1300 557 073
www.lenovo.com

'You'll never need to have that dreaded 'I forgot my password' conversation again.'

But the main changes have happened beneath the X41's calm, black exterior. The first item to note is the Sonoma-technology chipset, with Intel's 915GM Express in place. This brings with it 802.11a/b/g wireless radio.

The processor has also changed. Gone is the X40's Ultra Low Voltage offering, to be replaced by a 'mere' Low Voltage chip. The 1.5GHz Pentium M 758 certainly delivers in terms of performance. Quite apart from the impressive benchmarks, it feels sprightly in day-to-day use – both on the mains and off.

We expected the 915GM chipset and higher-voltage processor to affect this notebook's battery life, and to a certain extent it did. Whereas the extended-life eight-cell battery kept the X40 going for over seven hours in our light-use tests, the X41 lasted for six hours, 48 minutes.

The eight-cell battery comes as standard when using the product code 25256NM and we don't recommend saving money by opting for the four-cell version. The X41 is designed to be used on the move, and the standard battery will last for only about two-and-a-half hours under light use.

▼ Even with the eight-cell battery in place, the X41 weighs only 1.49kg.





High Tech Should Not Always Mean High Price!

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GA-K8N Pro-SLI NVIDIA nForce4 SLI Chipset

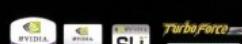
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K8 Triton™ series

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- AMD Athlon™ 64 platform
- NVIDIA SLI Multi-GPU function
- Dual Channel DDR400
- NVIDIA SATA 3.0Gb/s and RAID
- Gigabit Ethernet Solution
- NVIDIA ActiveArmor™ powered Firewall
- 8 Channel Audio



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- Supports: Windows & Mac

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- 40 times faster than USB 1
- Super compact, lightweight design! Great for mobile users
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- Supports: Windows & Mac

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- Drives not included
- Sleek aluminum case
- Supports: Windows & Mac

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TOSHIBA PORTÉGÉ R200

PRICE: \$3220 DELIVERY: \$12

LABS VERDICT

Outstandingly engineered. A slightly less ergonomic but lighter alternative to the X41.

Performance	
Features	
Value	

OVERALL



Toshiba's R100 redefined what it meant to be an ultra-portable laptop. Since then other manufacturers have caught up and even amazed us further in the case of the Sony X505. But there comes a point where you can now become impractically small. Many felt that the X505 certainly was and at first glance the new R200 skates pretty close to the edge.

But first impressions of this laptop were universally 'wow'. The magnesium alloy chassis is one of the toughest we've seen, yet when closed the entire machine is just two centimetres deep and weighs a feather-rivalling 1.29kg. Typically when a chassis is this small a great deal of features are lost. Yet this isn't immediately apparent from the specs sheet: Toshiba has squeezed in a 60GB and 512MB RAM. But, the processor is a 1.2GHz Ultra Low Voltage (ULV) Pentium M 753 and graphics are from the lowly Intel 915GMS chipset.

Not surprisingly performance isn't a strong point – only scoring 2181 PC Marks in PC Mark 04 – but it isn't supposed to be. This is designed for road warriors or travellers in general who need office applications on tap above all else.

But this isn't all the 200 offers. Toshiba has effectively copied many of the best ThinkPad features and added its own. On board is a Trusted Platform

Module (TPM) – a chip with unique model encryption capabilities. This, when partnered with the new finger print reader and a password makes the R200's security airtight. Also onboard is a hard disk monitor which clamps the heads shut to avoid hard disk damage in the event of a drop.

On the software front are the excellent ConfigFree and Summit apps making onboard 802.11b/g WLAN, BlueTooth 2 and Gigabit Ethernet connectivity a breeze. We particularly like the graphical radar-like representations of WLAN networks. The apps also mean that you don't have to keep entering different IP addresses every time you connect to a different network. The password-saving Omnipass means that entering web forms and frequent website passwords can be done automatically just by swiping your fingerprint. All that's missing is the ThinkPad's 'blue button' support features which allow you to backup and retrieve work under disastrous conditions.

'Toshiba's excellent power saving features are still the best on the market.'

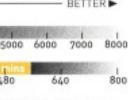
Toshiba's excellent power saving features are still the best on the market and really help to squeeze every last ounce of battery out of the laptop. We recommend also purchasing the extended life battery (\$182) which clips onto the bottom.

In our intensive use test the standard six-cell pack lasted two hours whereas for light use it lasted four. With the 12-cell option attached it ran our tests at full brightness for just over four hours and our light use test for a staggering nine hours.

In terms of wired connectivity there's not much. On the right is a PC Card slot and the WLAN power switch. On the left is a headphone jack, volume dial and SD card slot. While at the back are two USB 2 ports, Ethernet, modem and D-Sub connectors. Above the keyboard is a microphone.

The external DVD writer isn't included and will set you back a whopping \$540 though it's very small, well designed and takes its power from the USB port. We're also fans of the standard three-year international parts and labour warranty.

▼ At its thickest point the R200 measures just under 20mm.



▲ Despite weighing barely more than a kilo, this is one of the toughest notebooks we've seen.

So far it's slightly ahead of the ThinkPad but it doesn't quite finish in front. Indeed, while the 12.1in screen is perfectly adequate for most indoor conditions it's not as bright or as uniformly lit

as the ThinkPad. The viewing angles are also poor and different parts of the screen will appear differently unless you're looking straight at it. The keyboard is also inferior. The ThinkPad is the best in the business and while Toshiba's sports full size letter keys even with practice you'll be accidentally pressing the smaller keys surrounding it. Still, at least there's a Windows key. The trackpad also lets it down somewhat. It and its buttons are just too small and fiddly to use comfortably for a long time. While practice and an external mouse can improve things, the ThinkPad is undeniably more comfortable to use over extended periods.

It's a close run thing, and while the R200 will appeal to those who like the idea of throwing a super-light fully-featured PC into a travel bag and heading off, we feel the ThinkPad is more practical.

Nick Ross

SPECIFICATIONS

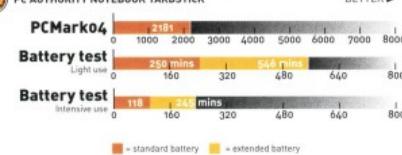
1.2GHz Pentium M 753 ULV; 512MB PC2-4200 RAM; 60GB hard disk; Intel 915GMS graphics; 12.1in 1024 x 768 TFT; 56K modem; infrared; Bluetooth 2; Gigabit Ethernet; 802.11b/g WLAN; 2 x USB 2; VGA; Type II PC Card slot; Windows XP Professional; 3yr RTB warranty. Dimensions: 286 x 229 x 20mm [WHD]. Weight: 1.19kg. Model code PPR20A-01K003

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www.gennix.net.au



PC AUTHORITY NOTEBOOK YARDSTICK



DELL DIMENSION 9100

PRICE: \$2699 **Delivery:** \$99

LABS VERDICT

A mid-range dual-core system that offers great value for money.

Performance



Features



Value



OVERALL



We put the call out to several of Australia's computer manufacturers to send us an affordable dual-core system, but it was only Dell that obliged. The Dimension 9100 is aimed at home and SOHO users who want power and expandability and it certainly fits the bill. The system case is pleasing to the eye – the white body with silver and black frontage does look stylish and is solidly built. A gap behind the front panel is an air vent for the thermal module which cools the CPU – a giveaway that this sports a BTX motherboard.

The right side of the case opens easily thanks to a well-designed button on the top. The chances are that many buyers will be looking inside as they may want to be adding the odd component. Indeed, there's only one optical drive, though it's a top-notch Philips DVD burner which offers 16x DVD+R and 8x DVD+R9 dual layer DVD writing as



Dell motherboard is based on the new 345P chipset which supports Pentium 4 and dual-core processors.

If you want to add a second hard disk it supports RAID 0 and 1. Flanking the 3GHz Pentium D CPU are two 512MB DDR PC5300 modules. Graphics come from an NVIDIA GeForce 6800 card. This, combined with the 160GB Maxtor Diamond Plus 9 hard disk, notched up an impressive 6066 PC Marks in PC Mark 04 and 2777 3D Marks in

with a 17 inch screen though many might plump for the \$100 upgrade to 19 inches. It is bright, well lit and colours are vibrant and look great. It also sports a useful four port USB 2 hub. The stand is also excellent, offering tilt, swivel and height adjustment. Watching films and playing games prove no problem and the only real technical deficiencies come from the mediocre horizontal viewing angles and the fact that dark colour shades turn black too soon – some detail will be lost in shadows.

Dell bundles the useful Sonic DigitalMedia LE 7 for disc burning and DVD creation. CyberLink PowerDVD DX 5, Microsoft Works 7 and Windows XP Home edition are included too. The price also includes a one year next-business-day warranty whereby if a problem can't be fixed over the phone a technician will come round to your home.

Naturally, being Dell, the system is configurable and you can tweak things as required. However, with this specification at this price it represents a great-value mid-range buy which will keep all but ardent gamers (who will feel limited by the graphics card and future games) happy for some years to come.

Nick Ross

SPECIFICATIONS

3GHz Pentium D; 1GB PC5300 DDR2 SDRAM; Dell proprietary 945P motherboard; 160GB Maxtor Diamond Plus 9 hard disks; Philips DVD8701 DVD writer; 256MB NVIDIA GeForce 6800 graphics; 17in Dell LCD monitor; Creative Sound Blaster Audigy 2 ZS audio; Sonic DigitalMedia LE 7; CyberLink PowerDVD DX 5; Windows XP Home Edition SP2. One year on-site next business day warranty.

SUPPLIER

Dell 1800 812 393
www.dell.com.au

► The 9100's styling fits in well with both home and office environments.

'Adding more components is a breeze thanks to Dell's well-thought-out tool-less design.'

well as 48x CD writing. Many people will have a spare drive knocking around but it would have been nice to see a cheap combo drive for disc copying. There's one spare 5.25 inch and two spare 3.5 inch external bays – no floppy is included.

True to the 'futuristic' BTX aims, gone are many legacy connections. There are no PS/2 ports for keyboard and mouse, no serial and no parallel connectors. Everything is USB. There are two ports on the front (along with headphone and mic jacks) and five at the back (though two are needed for keyboard and mouse). FireWire comes as part of the Creative Audigy 2 ZS sound card which also provides connectors for eight-channel audio. Note, however, that there are no speakers included – again, perhaps Dell thinks that many people will have some already? Adding more components is a breeze thanks to Dell's well-thought-out tool-less design. There's room for two more DIMMs plus there are spare 1x and 4x PCI Express slots, two PCI slots and a spare hard disk bay.

But few will be in a hurry to upgrade the existing components. The proprietary

3D Mark 05. Running our punitive Far Cry (Fort level) benchmark at 1280 x 1024 saw frame rates of 45fps. When we turned on the excellent HDR enhancements this dropped to a just-playable 24fps.

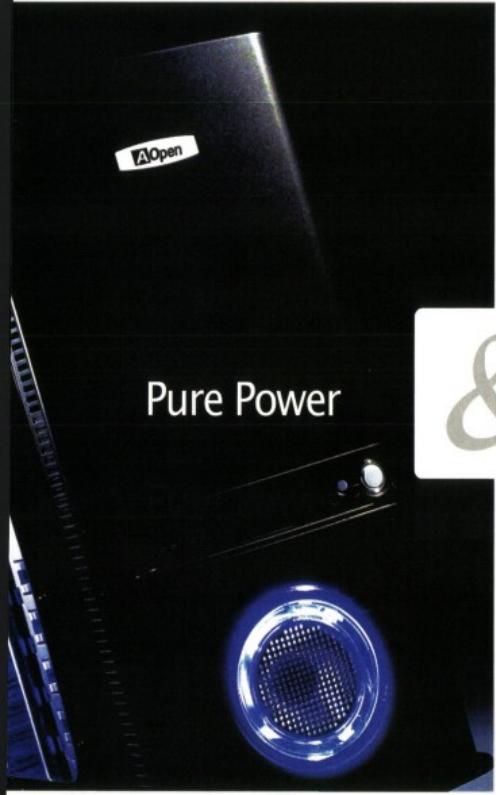
However, it's the benefits of the dual-core processor that will attract many people. While they're difficult to quantify at present, anyone who regularly has more than one application open at once, or even a whole host of applications running in the system tray, will notice fewer hangs and experience noticeable speed improvements.

The efficient cooling of the Thermal Module keeps the system components from making much noise. Indeed, the system would be practically silent were it not for the constant drone of the graphics card fan, though the noise isn't too distracting.

The keyboard, is comfortable to use and looks good with its bezel-less sides. However, we thought we'd seen the back of mice with balls and were disappointed that Dell included one.

However, we were seriously impressed with the LCD monitor. Our review system came





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- Plentiful expandability: 11 drive bays and 7 PCI slots



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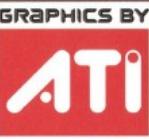
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FLAT SCREEN FRENZY

How will BenQ's new LCD line-up fare in our Labs?

LABS VERDICT

Not the best technical performers, but great value for bargain buyers.

FP71V

Performance



Features



Value



OVERALL



FP91V

Performance



Features



Value



OVERALL



BenQ's two new LCD screens offer incremental improvements to previous models that we've seen. The 17 inch FP71V and 19 inch FP91V offer faster response times (4ms grey to grey) than their sibling FP71V+ (5ms) and FP91V+ (6ms). More importantly they do away with the glossy coatings which enrich colours but enrage some people who can't abide the increased reflections.

The silver bezels look a little plasticy but aren't ugly enough to spoil a living room or office. The build quality is good and the small round bases are solid and allow easy swivelling. However, there's not height adjustment or pivot. However,



▲ Both the 17-inch FP71V and 19-inch FP91V offer 4ms, grey-to-grey response times, resulting in crisp quality in motion.

tests performance was fine; watching films and playing games caused no problems. Only the horizontal viewing angles could be better. All but those who demand technical excellence and colour reproduction from their monitors will be looked after in these screens.

As we noticed last month, the 17 inch market is fast becoming the budget LCD monitor market. So by offering a seven-day

'All but those who demand technical excellence and colour reproduction will find just what they need.'

we did like the onboard speakers which, despite being a little tinny, are very good as monitors go. We also like the quick change 'Senseye' button which switches between movie, picture and standard modes.

In our technical DisplayMate tests, neither could claim to be outstanding: the FP71V struggled to reproduce both dark and bright shades, while the FP791V's dark shades also turned black too soon. There was also noticeable banding in the colour ramps. However, in our real world

dead pixel guarantee plus a three-year no bright pixel warranty, at \$451 we're more than happy to recommend the FP71V. The FP91V offers the same excellent 7-day guarantee but allows for two bright pixels over three years. It's also up against the outstanding ViewSonic VX924 (see A List, page 29), which costs \$80 more but offers noticeably better quality. However, if you want the speakers and the guarantee, it's still a good-value buy.

Nick Ross

SPECIFICATIONS

BenQ FP71V

Price: \$451

Delivery: \$12

Supplier: Gennix www.gennix.net.au

Specifications: 17in LCD monitor; 4ms response time (grey-to-grey); 300cd/m² brightness; 500:1 contrast ratio; native resolution 1280 x 1024; DVI-D, D-SUB and 3.5mm audio inputs; TCO 03. Dimensions 375 x 201 x 385mm (WDH). Weight 4.7kg. 7-day zero dead pixel guarantee. 3-year warranty (zero bright, three dark pixels allowed).

BenQ FP91V

Price: \$630

Delivery: \$12

Supplier: Gennix www.gennix.net.au

Specifications: 19in LCD monitor; 4ms response time (grey-to-grey); 270cd/m² brightness; 550:1 contrast ratio; native res 1280 x 1024; DVI-D, D-SUB and 3.5mm audio inputs; TCO 03. Dimensions 410 x 215 x 419mm (WDH). Weight 6kg. 7-day zero dead pixel guarantee. 3-year warranty (two bright, five dark or five total dead pixels allowed)



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Duelling cores

David Fearon takes Intel's 945 and 955 for a spin.

Released to coincide with the dual-core Pentium D and Extreme Edition processors, Intel's new motherboard chipsets are essential for dual-core CPUs: try and put one of them into an old 915 or 925 Express-based board and the system will simply shut itself down. The prime reason behind the need for a new board is the fact that the new CPUs have a higher maximum power consumption, which the VRMs (voltage regulator modules) on older motherboards won't necessarily be specified for. Hence, if the older chipset is detected, the CPU shuts itself down with no damage to either processor or board.

The new chipsets do bear a lot of similarities to the previous-generation 915 and 925 chipsets: as with 915P and 915G, the 945 comes in both P and G forms, with the only difference between the two being that the G incorporates an integrated graphics chipset; the GMA 900 has been updated to become the GMA 950 (see GMA 950). And just as the 925X was aimed at high-end setups, so is the 955X.



▲ Intel's preferred choice for home and business systems, 945G integrates the new GMA 950 graphics.

But the new chipsets aren't simply an artificial designation to make sure motherboards can handle dual-core processors: there are technical differences and improvements too, albeit incremental ones. Both the 945 and 955 support processors with a 1066MHz front side bus, which was previously only possible with the Extreme Edition-specific 925XE chipset. Brand new is support for 667MHz DDR2 memory, which should provide the noticeable performance boost that's been lacking from DDR2-533 systems.

The final major technical difference shared by the two chipsets is a Serial ATA 2 interface, bringing bandwidth of 3Gb/s (around 357MB/s). In addition to these, Intel's Matrix RAID system has been enhanced. Matrix RAID allows two separate RAID partitions to be combined on one physical set of drives.

Previously you were limited to RAID0 (striping) and RAID1 (mirroring), but the new version also allows for a combination of RAID5 (striping with parity) and RAID10 (striped mirrors).

There are just two enhancements specific to only the 955X chipset, but the first is a very significant one for high-end applications: it's the first mainstream desktop chipset to break the 4GB barrier and allows up to 8GB main memory, in line with the removal of the 4GB limit enabled by the move to 64-bit processors and the release of the 64-bit edition of Windows XP. Second is the slightly tweaked memory latency enhancement similar to that which theoretically also distinguished 915 from 925, now called IMPT (Intel Memory Pipeline Technology). In practice, however, we've measured almost no difference between 945 and 955 in terms of memory performance.

NOW ON THIS PLATFORM...

If you're getting confused about which processor and chipset you need with the plethora of new single and dual-core CPUs, Intel is intending to come to your aid. It's coined possibly the ugliest word in the world and is now 'platformising' its product ranges.

In plain English, this means coralling its various devices under a single brand; it's similar to the very successful strategy pioneered by Centrino mobile technology. Centrino isn't a single product; it's a collection of three that work well together: Pentium M processor, chipset and wireless adaptor (which vary according to the particular Centrino device). It's so far worked well for the company, and it can't be denied that it simplifies things for end users.

So Intel is attempting to do the same with its desktop systems by grouping products together for particular target usage models. The first of these platformised products is the Professional Business Platform, which Intel has decided will mean a 600-series Pentium 4 (with Hyper-Threading, but not dual-core), the 945G chipset and Intel PRO/1000 PM network adaptor. The home-market version – called the Digital Home Platform – consists of the Pentium D (no Hyper-Threading, but dual-core) and either the 945G or 945P chipsets. It's a good bet that there'll be a new logo program before long, allowing confused consumers to shelter in the comfort of a symbol they can understand.

David Fearon

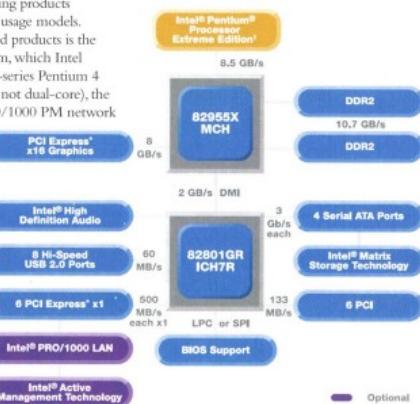
GMA 950

The integrated graphics of the 945G chipset have been slightly upgraded from the GMA 900 chipset incorporated into 915G boards. The clock frequency of the 256-bit graphics core is boosted from 333MHz to 400MHz. Intel also talks of Media Expansion Cards that will allow TV tuners and display output options.

The GMA series' heritage is based on the original Extreme Graphics chipset, a name that was dropped because performance was anything but extreme. The moderate clock-speed hike isn't enough to bring the GMA 950 anything other than a minor speed boost. DirectX 9.0 Vertex Shader 3 and T&L (transform and lighting) operations are still performed in software, leading to a big performance hit on geometry-intensive games – Far Cry at 1280 x 1024 chugs along at a mere 5fps even without anti-aliasing or anisotropic filtering.

For 2D applications, though, the chipset is more than adequate, allowing desktop resolutions of up to 2048 x 1536 at 75Hz, and an ADD2 (advanced digital display 2) extension card gives the ability to run two monitors simultaneously. There's full support for HDTV playback at up to 1080i too, with hardware motion compensation.

▼ 955X will tempt high-end 64-bit users with the prospect of more than 4GB of system memory.

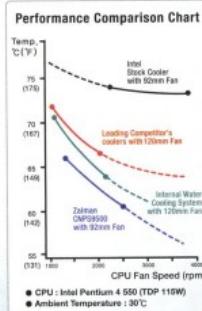


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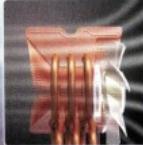
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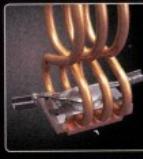


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0.2mm ultra slim fins for minimized weight and reduced airflow resistance

● Broad Compatibility



Intel Pentium 4 (Socket 775/478)



AMD Sempron/AMD64 (Socket 754/939/940)

Specifications

Dimensions (L x W x H)	163 x 112 x 125 mm (6.35 x 4.41 x 4.92 inch)
Heatsink Material	Pure Copper Heatpipes, Pure Copper Heatfin, Pure Copper Heatpipes
Weight	499g (17.56oz)
Dissipation Area	3,496cm ² (542.19 inch ²)
Fan Size	92 x 25 mm (3.62 x 0.98 inch)
Fan Operating Voltage	5-12V
Rated Current	0.35A
Max. Power Consumption	4.2W
Bearing Type	2-Ball Bearing
Fan Speed	1,350 - 2,600 rpm ±10%
Noise Level	18.0 - 27.5dB ±10%
Connector	3-Pin
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nForce4 SLI Intel Edition motherboards

ASUS P5ND2-SLI Deluxe, MSI P4N Diamond

LABS VERDICT

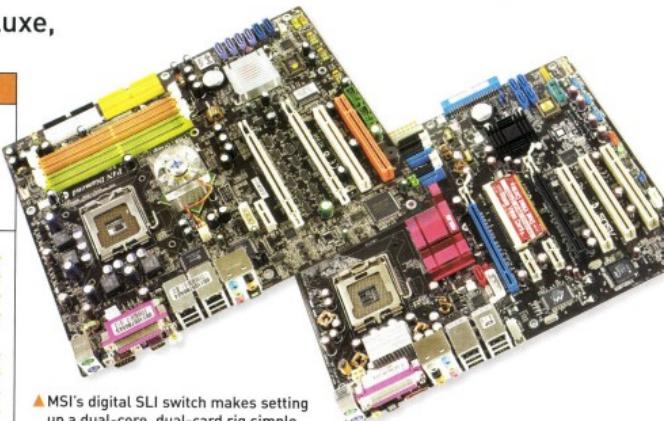
Two solid implementations of the nForce4 SLI Intel chipset but, in keeping with Intel's processor development, newer doesn't mean faster: just extra features. Both boards are quite expensive, but nForce4 is currently the only way to get Intel dual-core SLI rigs.

ASUS

Performance	★★★★★
Features	★★★★★
Value	★★★☆☆
OVERALL	★★★★☆

MSI

Performance	★★★★★
Features	★★★★★
Value	★★★☆☆
OVERALL	★★★★☆



▲ MSI's digital SLI switch makes setting up a dual-core, dual-card rig simple.

There's a dilemma facing any Intel fan wanting to upgrade their motherboard: which platform? Now that Intel has invited NVIDIA into the LGA775 party, there's more choice than ever before. The nForce4 chipset was a revolution for AMD, bringing not only PCI Express and SLI, but also extras such as a hardware firewall. These features give the nForce4 Intel Edition chipset the edge over Intel's 915 and 925 chipsets.

That's over-the-top for most current applications, but with Windows x64 Edition now shipping, it's of interest to those working in areas such as CAD and video editing. It's worth noting that both boards have only four RAM sockets though, and that memory modules holding more than 1GB are currently scarce and expensive.

But this is only one string to the nForce4 bow, with the hardware firewall adding a compelling reason to switch to NVIDIA.

'We welcome extras such as the NVIDIA Firewall and the bountiful connectors, but then you should be getting every bonus going when you pay this much for a motherboard.'

But the main highlight is nForce4's support for dual-core Pentium Ds or Extreme Editions – in terms of Intel chipsets, that's something you'll find only on its brand-new 945 and 955 chipsets (see page 48). We dropped a dual 2.8GHz Pentium D 820 into the MSI board and ran our strenuous 3ds max test against a single-cored 3.8GHz Pentium 4 570. The dual-core completed the task 19 seconds (18 percent) quicker. In everyday use, the second core won't be used so dramatically, but it will cope better than a single-core equivalent if you typically run lots of applications at the same time.

Elsewhere, the nForce4 SLI Intel Edition offers more bells and whistles than even Intel's 'premium' 925XE chipset. It can cope with memory clocked at 667MHz rather than the 925XE's 533MHz. Both nForce4 boards also support more RAM – the ASUS board up to 8GB and the MSI a whopping 16GB, as opposed to the 4GB maximum previously available through a combination of the 925XE chipset and 32-bit versions of Windows XP.

Used in conjunction with the ActiveArmour software, it provides an effective filter to anything that should get through to your network. It also minimises processor overheads on the twin Gigabit Ethernet connections of both boards, while maximising throughput.

Elsewhere, things are more even between nForce4 and 925XE. Both have RAID support for 0, 1, 0+1 and 5. And while NVIDIA has Serial ATA 2 support, Intel's AHCI (Advanced Host Controller Interface) allows for Hot Plug – the only part of the SATA 2 specification that's currently of any demonstrable benefit. There's NCQ (Native Command Queuing) on both platforms, and a hefty 2GB/s bus for integrated components. The NVIDIA MediaShield hard disk controller has some useful tools though, such as morphing. This lets you change your RAID configuration on-the-fly, with no compulsory need to back up your data and reformat the drives.

Performance is similar too, with scores for

ASUS offers lots of expansion opportunities, including two PCI Express 16x and two PCI Express 1x slots.

the MSI and ASUS boards only slightly different from the Abit AL8 (see opposite). The MSI completed our benchmarks 2.5 percent quicker than the ASUS, but you won't see a noticeable difference in use.

There's one area in which Intel still beats NVIDIA though, and that's with the new craze for integrated audio controllers. The High Definition Audio on the 915 and 925 still outstrips either of the nForce4 boards on paper. High Definition Audio states sampling rates of 192kHz at 32-bit resolution over eight channels. ASUS sticks with a conventional Realtek ALC850 audio codec, which gives only 48kHz sampling at 16-bit quality over eight channels.

MSI shows more originality in its choice of the Creative Sound Blaster Live! 24-bit, with sampling at 96kHz to eight channels. In practice, these are all fine for general use – if you need dedicated support for high bit rates, then you'll also need the dedicated sound processor well away from your PC's electronically noisy internals. However, the Sound Blaster is preferable to the ALC850, as it does at least provide provision for DVD-Audio playback.

MSI also impresses with its digital SLI switch. Unlike the mini-PCI card that needs to be switched round when installing a second graphics card on the ASUS, the digital switch automatically detects your setup. It's certainly a more elegant option, saving some potentially frustrating fiddling, as well as reducing the possibility of accidentally damaging the components or motherboard during graphics card installation.

It isn't entirely foolproof, as the NVIDIA driver doesn't automatically enable SLI, even though Windows XP will pop up a notification bubble

telling you that you have a SLI-compatible setup. You also sacrifice a PCI Express expansion slot to the two rows of chips.

There's still plenty of expansion potential available, though, with one PCI Express 1x and two PCI slots on the MSI. The second 16x slot can always be used as a further 1x slot should gaming not be important to you. However, if you need a lot of expansion slots, the ASUS is a better bet: the three PCI slots and two PCI Express should be enough for most. ASUS also spreads the 16x slots further apart, which allows for better cooling, especially if you want to use a pair of double-height cards.

Both nForce4 boards are well-featured, as befits top-end boards costing well over \$300. There are two parallel ATA and six SATA 2 connectors, dual Gigabit Ethernet and plenty of USB and FireWire headers on both. Both boards also come with every cable and connector you'll need, as well as extra USB and FireWire back panels. ASUS also bundles the WinDVD Suite and a retention bracket to keep the SLI bridge PCB in place. It's handy if you plan to move the system, since the bridge works itself loose easily.

We welcome extras such as the NVIDIA Firewall and the bountiful connectors, but then you should be getting every bonus going when you pay this much for a motherboard. You can pick up a 925XE board for \$200 these days, which will offer the same performance. However, if you want a dual-core SLI rig then we prefer the MSI. The digital SLI switch is elegant, the onboard audio is at least theoretically superior, and there's a larger RAM threshold should you need it. It's also \$40 cheaper. But if you can forego the NVIDIA extras on your dual-core rig then consider an Intel 945 board such as Abit's AL8.

Clive Webster

SPECIFICATIONS

MSI

Price: \$374
Delivery: \$15
Supplier: PC Express (02) 9584 0567
www.pc-express.com.au

Socket 775 motherboard; NVIDIA nForce4 SLI Intel Edition chipset; 4 x DDR2 RAM sockets; maximum 16GB memory; 2 x Ultra ATA/133 connectors; 6 x SATA 2 connectors; 2 x PCI, 1 x PCI-E [1x]; 2 x PCI-E [16x]; 2 x PS/2; 2 x Gigabit Ethernet; 4 x USB 2; FireWire; Creative Sound Blaster Live! 24-bit 7.1 audio; optical and digital S/PDIF out.

ASUS

Price: \$335
Delivery: \$10
Supplier: Bargain 1300 388 688
www.bargain.net

Socket 775 motherboard; NVIDIA nForce4 SLI Intel Edition chipset; 4 x DDR2 RAM sockets; maximum 8GB memory; 2 x Ultra ATA/133 connectors; 6 x SATA 2 connectors; 3 x PCI, 2 x PCI-E [1x], 2 x PCI-E [16x]; 2 x PS/2; 2 x Gigabit Ethernet; 4 x USB 2; FireWire; Realtek ALC850 audio; optical and digital S/PDIF out.

TEST RIG: 3.8GHz Pentium 4 730; 1GB Crucial DDR2 PC3200 RAM; 36GB Western Digital Raptor hard disk; XFX 128MB GeForce 6600 GT graphics.

Abit AL8

PRICE: \$269 **DELIVERY:** Reseller dependent



LABS VERDICT

The AL8 may not have all the extras of nForce4, but it's still fast and reasonably priced.

Performance
Features
Value



OVERALL



The nForce4 SLI Intel Edition chipset (see opposite) gives the new Intel platforms some stiff competition: a hardware firewall and SLI support are only the tip of the iceberg with its new chipsets. Intel had to decide whether to go head-to-head in an extra features slugging match or undercut NVIDIA by offering better value. Typically, it's done both.

The 955XE chipset will offer every extra feature that Intel can muster, while this more value-focused 945P board from Abit is about \$70 cheaper than either board opposite – even less from some resellers. As a 945 board, the AL8 won't take the new dual-core Pentium Extreme Edition, but will take any other pinless Pentium 4 or Pentium D.

Using our standard test kit, we saw comparable scores to those from the nForce4 boards. You won't notice the difference in everyday use. What you will notice is the brilliance of a Pentium D – a 2.8GHz 820 beat our Hyper-Threaded 3.8GHz 570 in our multithreaded 3ds max test by more than 11 percent.

Thankfully, the AL8 isn't devoid of features, even though it's cheaper than either nForce4 board. There's High Definition Audio from the ICH7R south bridge and Realtek ALC880 codec. The specification comfortably beats the AC97 audio of the nForce4 boards, although you'll need a serious audio setup to notice. Like the nForce boards, it will give you eight audio channels, but with the added advantage of being able to assign them independently to different audio streams.

The ICH7R south bridge does more than feed the audio codec. The 'R' suffix indicates the inclusion of Intel Matrix Storage (with support for RAID0, 1, 5 and 10), AHCI (Advanced Host Controller Interface) and NCQ (Native Command Queuing). This makes the most of any SATA hard disk attached to its four ports (as long as they're advanced enough to take advantage). Abit

also uses the ubiquitous Silicon Image 3132 chip to create two extra SATA 2 connections. Unfortunately, they're placed oddly, making attaching a drive awkward.

For legacy connections there's only one parallel ATA connector; if you still have a parallel ATA hard disk, you'll have to share its connection with your optical drive. There's still a floppy connector should you not trust Windows-based BIOS flashing though. There are also two PCI slots,



▲ A fast dual-core motherboard for under \$300.

which should be ample, even if you want to usurp the High Definition Audio.

Complementing these slots are three PCI Express slots and the single 16x graphics slot. There's a USB, FireWire and mini-FireWire backplane provided to neatly connect external devices.

Coming in cheaper than an nForce4 Intel board, the Abit has a lot of appeal. Performance is on a par with the nForce4, there are plenty of storage options, and the onboard High Definition Audio is a bonus. However, the lack of a hardware firewall, SLI and a second Gigabit Ethernet port might persuade you that extra is better spent on the MSI. But if a decent dual-core motherboard with good performance at a fair price is what you're looking for, the Abit AL8 is a fine choice.

Clive Webster

SPECIFICATIONS

Socket 775 motherboard; Intel 945P chipset; 4 x DDR2 RAM sockets; maximum 4GB memory; Ultra ATA/133 connector; 6 x SATA 2 connectors; 2 x PCI, 3 x PCI-E [1x], 1 x PCI-E [16x]; 2 x PS/2; Gigabit Ethernet; parallel; serial; 4 x USB 2; FireWire; Realtek ALC880 7.1 audio; 2 x digital S/PDIF out.

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www.altech.com.au

EXTREME GRAPHICS

With new graphics cards appearing to suit all budgets, we tell you which ones you should be buying.

A slew of cards were released this month. Most were NVIDIA-based. Unfortunately, ATI's only offering was the X800GT, yet another X800 variant, designed to be competitive against NVIDIA's 6600GT – the current de facto value graphics card.

We criticised the 7800GTX when it first launched for being too powerful and expensive; there simply weren't the games available to find any use for it. While it's true the effects in NVIDIA's 'Luna' and 'Mad Mod Mike' demos

were jaw dropping, they remain the only place to see genuine benefits of enhancements like Shader Model 3 and Depth of Field. The latter promises to enhance future games: frames are essentially rendered twice in two planes. In the front plane everything is in sharp focus. In the rear plane everything blurs (at various amounts depending on its distance). Only the monstrous power of the 7800 chipset can render this at present but there won't be a game that uses it for ages – by which time the 7800GTX price will have dropped.

But a true benefit of high end cards is High Dynamic Range (HDR) lighting effects. At present only the phenomenal Far Cry offers such enhancements.

To test the cards we used 3D Mark 05, Doom 3 and our Far Cry (Fort level) benchmark with HDR turned on and off. All tests were run at 1280 x 1024 and 1600 x 1200 resolutions. Remember, that all 17 inch and 19 inch LCD monitors won't play beyond 1280 x 1024 so it's pointless buying a card based on higher resolution performance.

ALBATRON NVIDIA GEFORCE 7800GT

LABS VERDICT

The smaller sibling of the 7800 GTX, the GT offers very similar performance on a budget.

Performance



Features



Value



OVERALL



The 7800 GTX is undoubtedly the fastest graphics card around at the moment.

The GT variant is very similar to it, with the same core GPU, but set to 400MHz, while the RAM is clocked to 500MHz; compared to 430MHz and 600MHz on the GTX. Four of the GTX's 24 pipelines are closed off. Nonetheless, our benchmark tests revealed the GT to be a gaming monster. In our Doom 3 tests the difference between the 7800GT and BFG's

overclocked cards was negligible. With all settings set to very high a constant 80fps was achieved at 1280 x 1024. This only dropped to 69fps when running at 1600 x 1200 – just 6fps behind the GTX.

To see how far we could push it we turned on 8x anti-aliasing, 16x anisotropic filtering and supersampling transparency anti-aliasing. At 1600 x 1200 it managed 22fps. This is hot on the heels of the 25fps scored by straight GTX cards. Dropping the resolution to 1280 x 1024 raised the rate to 34fps, and dropping the settings to 4x anti-aliasing and 8x anisotropic filtering resulted in scores of 59fps and 44fps at 1280 x 1024 and 1600 x 1200. It's impressive stuff.

For those who like to compare cards through synthetic benchmarks it scored 5710 3D Marks in our 3D Mark 2005 test at 1280 x 1024 which dropped to 4904 3D Marks when we upped matters to 1600 x 1200.



Far Cry remains one of the most popular games at the moment. For all the 7800-based cards the scores for 1280 x 1024 were similar to the 1600 x 1200 scores when no enhancements were turned on; between 56 and 58fps in all tests. Turning on HDR saw the 7800GT drop to only 47fps and 36fps at 1280 x 1024 and 1600 x 1200 respectively.

Considering that such immense power is available at some \$200 less than the cheapest 7800GTs it seems silly to pay the extra.

	Albatron NVIDIA GEFORCE 7800GT	Scenic ATI RADEON X800 GT	BFG NVIDIA GEFORCE 7800GT OC	BFG NVIDIA GEFORCE 7800GT OC
Price (inc GST)	\$439	\$269	\$749	\$899
Price of delivery (inc GST)	\$15	Depends on reseller	Depends on reseller	Depends on reseller
Cheapest price	Netac (02) 9212 6686	Kingmax (02) 9648 4658	Xlink (02) 99467 1549	Xlink (02) 99467 1549
Website	www.netac.com.au	www.kingmax.com.au	www.xlink.com.au	www.xlink.com.au
Product supplied by	Albatron www.albatron.com.tw	Kingmax www.kingmax.com.au	Kingmax www.kingmax.com.au	Kingmax www.kingmax.com.au
Warranty	1yr RTB	1yr RTB	Lifetime RTB	Lifetime RTB
Specification				
Interface	PCI-E 16x	PCI-E 16x	PCI-E 16x	PCI-E 16x
GPU frequency	400MHz	475MHz	425MHz	460MHz
Onboard memory	256MB DDR3	256MB DDR3	256MB DDR3	256MB DDR3
Memory frequency	500MHz	499MHz	523MHz	650MHz
Memory bandwidth (GB/s)	31.3	30.6	32.8	41.6
Pixel fill rate (Gpixels/s)	8	3.8	8.8	11
Number of vertex shaders	7	8	7	8
Number of pixel pipelines	20	8	20	24
Connections				
D-SUB/DVI	2 x DVI	D-SUB; DVI	2 x DVI	2 x DVI
Video out	Component; composite and S-Video via splitter cable	Component via splitter cable; Composite and S-Video via splitter cable	Composite and S-Video via splitter cable; Component and S-Video via breakout box	Composite and S-Video via splitter cable; Component and S-Video via breakout box
Video in	Composite and S-Video via splitter cable	N/A	Composite and S-Video via splitter cable	Composite and S-Video via splitter cable
Software and accessories supplied				
Applications	CyberLink PowerDirector 2.5 ME	CyberLink PowerDVD 5	Ulead VideoStudio 9.5E	Ulead VideoStudio 9.5E
Games	ARX Fatalis; Zax; ADW II; Max Payne; Rally Trophy; Beam Breakers	Counter Strike: Condition Zero	None	None
Cables	Composite/molex power converter; S-Video	Molex power converter	Molex power converter	Molex power converter
Converters	DVI-to-D-SUB	DVI-to-D-SUB	2 x DVI-to-D-SUB	2 x DVI-to-D-SUB

GECUBE ATI RADEON X800 GT**BFG NVIDIA GEFORCE 7800GT OC****BFG NVIDIA GEFORCE 7800GTX OC**

**PC AUTHORITY
EXCLUSIVE**

LABS VERDICT

A top value card, but it can't compete with the SLI capability of the 6600GTs.

Ease of use	★★★★★
Features	★★★★★
Value	★★★★★

OVERALL ★★★★★

LABS VERDICT

First off the block compared to the Albatron, but a little too pricey in comparison.

Ease of use	★★★★★
Features	★★★★★
Value	★★★★★

OVERALL ★★★★★

LABS VERDICT

The quick 7800GTX just got faster. A beast of a card, but you're paying for the premium.

Ease of use	★★★★★
Features	★★★★★
Value	★★★★★

OVERALL ★★★★★

NVIDIA's 6600GT graphics cards have been the value cards of choice for an entire year now, with the 7800s ruling the top end. So we were surprised that ATI's only release this month was its competitor.

In 3DMark 2005 a score of 3216 at 1280 x 1024 is far higher than the 6600GTs 2882. In the real world Doom 3 test the 6600GT was 12fps faster in both tests – though it's an NVIDIA-biased game.

In Far Cry, scores of 54fps and 45fps just beat the 6600GT's 51fps and 40fps. But ATI cards are incompatible with Far Cry's HDR. Considering also that the 6600GT also offers an upgrade path (by running a second card in SLI) there seems little point in plumping for the X800GT's invisible frame rate increases.

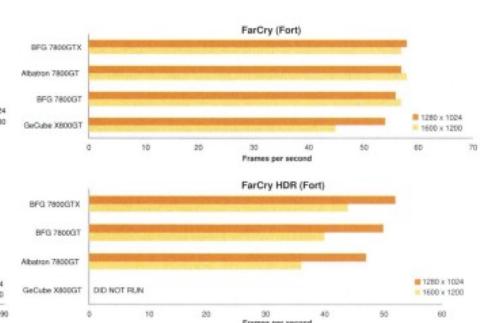
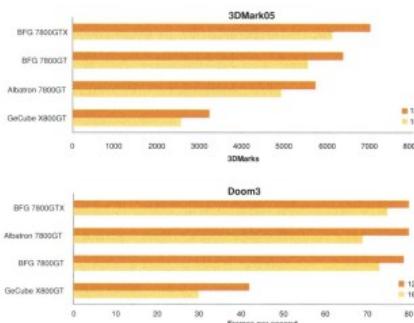
BFG overclocks the 7800GT's core clock from 400MHz to 425MHz and the memory from 500MHz to 525MHz. In 3DMark 2005 this led to 10 percent higher scores over the Albatron. In Doom 3 there was no difference at 1280 x 1024 while at 1600 x 1200 the BFG was only 4fps faster.

Far Cry without HDR saw no tangible benefit over the standard clocked card while frame rates of 50fps and 40fps at 1280 x 1024 and 1600 x 1200 respectively were 3fps and 4fps faster. This last test shows the overclocked GT to offer similar performance to a standard clocked 7800GTX, though its RRP is around \$100 cheaper. But it's still \$110 more than the Albatron and although BFG offers a lifetime warranty and free 24/7 tech support, we see little point in paying the premium.

BFG's 7800GTX OC is an overclocked version of the already over-powerful 7800GTX. The core clock is increased from 430MHz to 460MHz and the memory clock from 600MHz to 650MHz.

The result saw the 7000 3D Mark 05 barrier broken with a score of 7014 at 1280 x 1024. A stonking 6105 3D Marks were scored at 1600 x 1200; indications of extreme speed. But in Doom 3 and our straight Far Cry tests we saw no performance gains over the 7800GT card – suggesting a bottle neck on our already high-end test rig – if you're buying a 7800GTX you'll need a bleeding edge system to make use of it.

With HDR on we only saw 5fps and 8fps improvements over the 7800GTX. At \$900 the benefit is disproportionate considering the Albatron costs two-thirds as much.



SLI ON THE CHEAP

SLI sounds attractive, but many can't justify the price.
Nick Ross looks Gigabyte's dual GPU option.

PC AUTHORITY
EXCLUSIVE

LABS VERDICT

You won't find a cheaper way of getting an SLI system up and running than this.

GA-K8N-SLI

Performance



Features



Value



OVERALL



GV-3D1-XL

Performance



Features



Value



OVERALL



It's hard to believe that people questioned the point of SLI when it first came out. The idea of using two graphics cards when a single one could more-than-capably handle the latest games, seemed absurd. Well the latter is still true, only now NVIDIA is counting the immense profit they've made from the system.

Motherboards and graphics cards are flying off the shelves, SLI versions of Intel motherboards are now available and even Dell this month announced that it would be offering AMD-based SLI systems – the first time Dell has broken Intel exclusivity. Instead of laughing at NVIDIA, ATI is now (supposedly) developing their own 'Crossfire' dual-card system. In short SLI is very popular. But until now it's required a significant outlay to buy into. Gigabyte aims to change that.

'The idea of using two graphics cards when a single one could more-than-capably handle the latest games, seemed absurd.'

This month also saw NVIDIA release drivers which allowed its low-end graphics cards (without SLI connectors) to run in SLI mode using the PCI Express bus. Gigabyte has modified this system to put two chips on one card – the GV-3D1-XL sports two 6600 GPUs – which can work together in SLI mode. The cost savings over producing two separate cards in two separate packets is enormous, leading to price savings all round.

However, you need a compatible Gigabyte motherboard to get the system working. Until recently only Gigabyte's high-end socket 939 GA-K8NXP-SLI fitted the bill and if you could afford this then you wouldn't be buying a low-end graphics card. Now Gigabyte has released the GA-K8N-SLI – a stripped down version of the GA-K8NXP-SLI. Out are features like onboard WLAN, dual Bios and, most notably, FireWire. But with the likes of four SATA slots, six USB ports, eight-channel audio and four DIMM

► The GV-3D1-XL is impressively quiet considering it sports two fans. All components on the GA-K8N-SLI are passively cooled.

sockets, it remains very usable. In our tests its performance was only slightly inferior to the top model – scoring only 76 fewer PC Marks in PC Mark 04 and 2fps less in our 1280 x 1024 Far Cry test.

At the time of going to press both products were so new that we couldn't get a supplier's price but with an RRP of \$188 for the GA-K8N-SLI it's likely to be the cheapest SLI motherboard on the market. Only the lack of FireWire gets it an award.

With an RRP of \$361 for the GV-3D1-XL it's going to be available for roughly the same price as a 6600GT – the current sweet spot for value graphics cards at present. So it was against a Leadtek 6600GT that we compared it.

In our Doom 3 tests, both cards could easily handle the top resolutions and settings so we weren't too fussed about the Gigabyte's score of 59fps being higher than the 6600GT's 42fps. Anything above 30fps is perfectly playable.

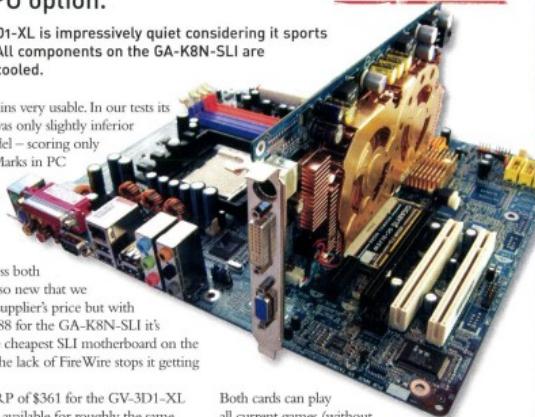
In the synthetic world of 3D Mark 2005 the Gigabyte cards scored noticeably higher: 2882 and 2285 3D Marks were scored by the 6600GT in the 1280 x 1024 and 1600 x 1200 resolution

tests respectively, while the Gigabyte scored 4638 and 3545.

At present the excellent Far Cry provides the best real world test for graphics cards. We ran our Fort level test at 1280 x 1024 and 1600 x 1200 with the complex High Definition Rendering (HDR) turned on and off. Both easily coped with 1600 x 1200 resolutions with the 6600GT scoring 40fps and the dual 6600s scoring 50fps. People may occasionally notice the extra headroom of the Gigabyte card when the screen gets busy.

However, turning on HDR saw major performance hits and performance became identical. At 1280 x 1024 they managed 22fps and at 1600 x 1200 they scored 15fps. While both frame rates aren't unplayable, things will get very jerky when the action hots up.

For now however, although the 6600s are undeniably more powerful than a single 6600GT it's unlikely that many will notice a difference.



Both cards can play all current games (without HDR) up to 1600 x 1200. A single 6600GT also offers great future proofing as you can buy a second 6600GT when you need it. While it remains theoretically possible to use two dual-chip cards in SLI mode, Gigabyte's body language suggests it's not part of the immediate plans.

However, together the GA-K8N-SLI and GV-3D1-XL represent good value. If you want to upgrade to PCI Express and SLI power in one fell swoop, this is a very good value way of doing it.

Nick Ross

SPECIFICATIONS

GA-K8N-SLI

Price: \$188 RRP

Supplier: Gigabyte

Specifications: Socket 939 motherboard; NVIDIA nForce 4 SLI chipset; 4 x DDR RAM sockets; maximum 4GB memory; 2 x Ultra ATA/133 connector; 4 x SATA connectors; 2 x PCI, 2 x PCI-E (1x), 2 x PCI-E (16x); 2 x PS/2; Gigabit Ethernet; parallel; serial; 6 x USB 2; AC '97 7.1 audio; coaxial S/PDIF in and out.

GV-3D1-XL

Price: \$361 RRP

Supplier: Gigabyte

Specifications: PCI Express graphics card; 2 x NVIDIA GeForce 6600 GPUs; 450MHz core clock; 256MB 500MHz GDDR3 RAM; 2 x 128-bit memory interface; 2 x 8 pixel pipelines, 2 x 3 vertex shaders; S-Video and component video out; D-SUB and DVI-D; CyberLink PowerDVD 5; Joint Operations: Typhoon Rising; Thief: Deadly Shadows

TEST RIG: AMD Athlon 64 2500+; WD 36GB Raptor; 512MB PC3200 RAM; BFG 7800GT DC graphics card.

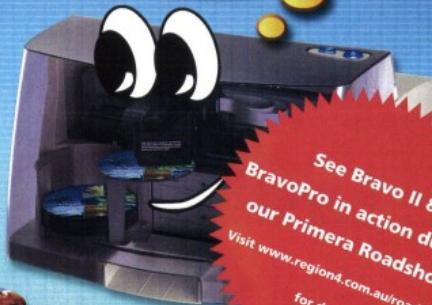
Reliability Runs in the Family

I look up to
my new big brother...
he's tall, he's fast,
and he's tough!

My little brother
takes after me... not
only are we both
handsome, we both get
the job done!



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Dell OptiPlex GX620 Series

PC Authority exclusively reveals the next generation of office geek toys that will revolutionise the way you punch numbers into Excel.

LABS VERDICT

Who says business PCs must be dull? Not Dell: it's taken advantage of the Intel 945 chipset to create a line of stylish PCs that are both quiet and perfectly tuned for business. The smallest chassis – the USFF – is a particular gem.

PRICE: From \$1439

DELIVERY: Free

SUPPLIER: Dell 1800 812 393

WEB: www.dell.com.au

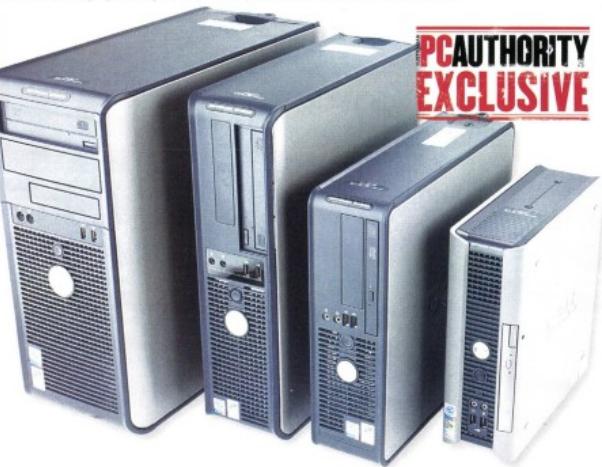
On size fits all isn't a mantra an IT department can live by. Different sections within your organisation, even different individuals, have their own requirements when it comes to PCs, yet choosing several different models rapidly increases support costs.

Until now, it hasn't been possible to satisfy an entire organisation's needs with one hard-disk image, but thanks to Intel's 945 chipset that's all about to change. Dell is the first manufacturer to rise to the challenge, with its OptiPlex GX620 range designed to satisfy diversity by offering different chassis and specifications, but with a common architecture and hard-disk image that will work across all models.

Here we review the entire GX620 series, so that you can see how they stack up against each other. We also mention the OptiPlex GX520 range. No samples were available for review, but it forms part of the same family and the two ranges have many similarities.

In fact, the three cases that make up the GX520 range – Small Form Factor (SF), Desktop (DT) and Mini-tower (MT) – are also used in Dell's GX620 range.

▼ **Opening up the GX620 SF reveals one slight problem: warm air being pushed from the heatsink onto the hard disk assembly.**



**PC AUTHORITY
EXCLUSIVE**

'Security-conscious businesses should also note that only the GX620 includes a TPM (Trusted Platform Module). This device helps to block attacks by providing hardware network authentication.'

but the GX620 gets a pint-sized fourth member too called the Ultra Small Form Factor (USFF).

Combining both series gives you four chassis and seven basic models to choose from, with image and BIOS compatibility throughout. The GX620 devices, with their bigger designation number, are the high achievers of the family. The difference, says Dell, is that the GX520s are for deployment as mainstream PCs, with perhaps a three-year lifespan before disposal, whereas the GX620s, with more complex motherboards higher specifications and better upgrade possibilities, are destined for more demanding environments that require longer deployment.

Security-conscious businesses should also note that only the GX620 includes a TPM (Trusted Platform Module). This device helps to block hackers by providing hardware network authentication.

The key element that ties all the models together is the Intel 945 Express chipset. Besides performance advantages and new features, its newness makes it a good choice

for longevity across a progressive rollout. Dell says it will offer the platforms for about 15 months.

SPECIFICATIONS

Processor choice is varied, with Celeron D and Pentium 4 options being supplemented by dual-core Pentium D chips in the GX620 range. The GX520 range and the smallest GX620 are limited to 2GB of 533MHz (PC4300) DDR2 SDRAM across two DIMM sockets, but the three larger GX620s have four sockets for up to 4GB.

All units share Intel's GMA 950 integrated graphics core, offering solid performance for most business users. Those who want more 3D punch can opt for a 128MB ATI RADEON X600 SE in a GX620, with the exception of the USFF. Like the three GX520 models, it lacks a PCI Express 16x slot.

But the GX620 USFF has an intriguing zero footprint option, whereby it can be bolted onto the back of Dell's 17in 1706FP AIO TFT. This is also available with the next size up – the SF – which can utilise





▲ Enjoy a 'zero footprint' PC by mounting the USFF or SF behind a 17in or 19in AIO screen.

the 19in 1906FP AIO display as well. The USFF's discreet design makes it a particularly appealing option.

SUPPORT

All the OptiPlex GX PCs come with a three-year on-site, next-business-day warranty with lifetime telephone support for troubleshooting during business hours. If you perform in-house maintenance, you'll be delighted by how easy the new chassis are to open – although you can, of course, lock them, and there are chassis-intrusion detectors too – with Dell having wisely abandoned its previous clamshell design.

The new chassis also have a simple but practical set of diagnostic lights called DirectDetect. Labelled 1, 2, 3 and 4, these LEDs show one of 16 patterns that identify which component is at fault, including BIOS, CPU, memory, PCI device, storage device, video subsystem, USB subsystem and motherboard.

The USFF is the only one that doesn't have them on the front panel; instead, you'll have to look round the back.

FEATURES

All systems have microphone and headphone jacks at the front – handy placed for VoIP – along with two USB 2

▼ The GX620 MT [reviewed overleaf] is particularly easy to work inside.



Dell OptiPlex GX620 USFF

PRICE: \$1439 (no monitor)



LABS VERDICT

	Performance	Features	Value	OVERALL
Performance	★★★★★	★★★★★	★★★★★	★★★★★
Features	★★★★★	★★★★★	★★★★★	★★★★★
Value	★★★★★	★★★★★	★★★★★	★★★★★

The smallest of the four GX620s is the diminutive USFF; with an external power adapter. In addition to making the computer case smaller, it reduces the amount of heat generated inside, leading to a cooler, quieter PC. The tidiness of the internals has immediate impact. Only the hard disk's skinny Serial ATA cable is near the two DIMM sockets, and to have such easy memory access in a system of this size shows off Dell's design work admirably.

Down the right-hand side of the interior there's a smooth airflow channel for the CPU, with an intake fan in the front, then the CPU's large copper heatsink, with an exhaust fan at the rear. A plastic duct sits over the case to control the flow. By using a notebook optical drive, which can be pulled out with a lever, there's no need for access within the case. It's fitted under the motherboard. Together with the hard disk and memory, this is all you can change: there are no PCI slots to take expansion cards. It already has a DVI-I video port and a Y-cable to split it into separate DVI-D and VGA plugs.

SPECIFICATIONS

3GHz Pentium 4 531; 512MB PC4300 RAM; Intel 945G Express chipset; 80GB hard disk; combo CD-RW/DVD-ROM drive; Intel GMA 950 graphics; Gigabit Ethernet; 7 x USB 2; serial; parallel; DVI-I with adaptor for D-SUB VGA; Windows XP Professional; 3yr on-site NBD warranty. Dimensions: 89 x 266 x 264mm (WDH).

Dell OptiPlex GX620 SF

PRICE: \$1499 (no monitor)

LABS VERDICT

	Performance	Features	Value	OVERALL
Performance	★★★★★	★★★★★	★★★★★	★★★★★
Features	★★★★★	★★★★★	★★★★★	★★★★★
Value	★★★★★	★★★★★	★★★★★	★★★★★

One step up in size is the SE. Surprisingly, the four DIMM sockets look harder to access than with its smaller sibling, because the optical drive is in the way. But the latter lifts straight out after releasing a lever. Underneath that there's space for a 3.5in bay for a floppy drive – a notebook version so as not to obstruct the nearby PSU and memory.

The processor and heatsink sit just behind the intake fan that's attached to the front grille, and warm air is pushed out the back of the heatsink and straight at the hard disk assembly. The air then works its way around the case to exit through the vent at the back. We're not talking about a rush of air – it's very gentle in this quiet system – but it's much less elegant than the USFF.

The hard disk is also trickier to remove, at least until you've been through the fiddly process once. However, expansion is possible with this chassis, by fitting a low-profile card in the PCI slot or a low-profile graphics card in the PCI Express 16x slot.

SPECIFICATIONS

3GHz Pentium 4 531; 512MB PC4300 RAM; Intel 945G Express chipset; 80GB hard disk; combo CD-RW/DVD-ROM drive; Intel GMA 950 graphics; PCI slot; PCI Express 16x slot; Gigabit Ethernet; 8 x USB 2; serial; parallel; VGA out; Windows XP Professional; Dimensions: 93 x 340 x 314mm (WDH).



'When you combine the support savings due to the common disk image, no other business PCs can match them.'

ports. These are much easier to access than in previous Dell designs, and generous spacing between the ports means you can easily fit two flash drives, for instance, at the same time.

The three smallest cases are designed to stand upright like the MT if you choose, allowing more freedom in desk layout. However, in a bizarre omission, Dell hasn't added rubber feet for vertical orientation. You can feel some vibration through a desk, and our SF case hummed faintly because of this.

To accompany these PCs, Dell supplied us with two of its TFTs: a 17in UltraSharp 1704FPT and a 19in UltraSharp 1905FP, costing \$459 and \$629 respectively.

As well as benefiting from VGA and DVI inputs, the flexible stands have tilt, swivel and height adjustment, and portrait rotation. Other attractions include a USB hub, with two ports at the back and two on the left-hand side behind the bezel, plus

clips for optional Dell Soundbar speakers.

The pick of the two is undoubtedly the 1905FP: it's an above-average TFT, with good viewing angles and vivid colours. The 1704FPT screen was less impressive: it's brighter at default settings, but that washes out highlights, and turning down the brightness starts turning white into blue-grey. It also lacks crispness over the analog input.

CONCLUSION

Dell's new OptiPlex GX620 range represents a stride forward in business PC design. Our pick is the USFF, but the DT also offers a very good compromise between size and value.

Across the whole range, it's hard to fault the designs. They're quiet, attractive and – aside from the MT – compact, with up-to-the-minute technology, including the 945G Express chipset and dual-core CPU options.



▲ The innards of OptiPlex case highlights Dell's characteristically simple layout.

When you combine the support savings due to the common disk image, no other business PCs can match them.

The OptiPlex GX620 range also flouts the rule that business PCs must look plain. If it's time to refresh your PCs, and you want a range of powerful options, the GX620 is the new leader.

Dell OptiPlex GX620 DT

PRICE: \$1499 (no monitor)

LABS VERDICT

Performance	★★★★★
Features	★★★★★
Value	★★★★★
OVERALL	★★★★★

Next up is the desktop case. For the first time, we leave behind the notebook-style optical drives in favour of a standard unit. There's also a 3.5in bay for a floppy drive. Two of the four DIMM memory sockets are unobstructed, although you must unclip the optical drive to expose the other two. We also saw two SATA ports on the motherboard for the first time, but that's for taking a ghost image of the primary disk. For dual-drive setups, Dell recommends the larger MT chassis.

The CPU and heatsink arrangement is similar to the SF chassis, although with the hard disk beside it and out of the way the airflow to the rear grille is unobstructed, unless you run full-height expansion cards. There's one PCI-E 16x slot and two standard PCI slots, all taking half-height cards. However, you can install one of two optional full-height risers, the first supporting two PCI cards and the second supporting one PCI card and one PCI-E 16x graphics card. Our machine came with a small DVI converter card in the PCI-E slot to supplement the VGA output on the rear panel.

SPECIFICATIONS

3GHz Pentium 4 630; 512MB PC4300 RAM; Intel 945G Express chipset; 80GB hard disk; combo CD-RW/DVD-ROM drive; Intel GMA 950 graphics; Gigabit Ethernet; 8 x USB 2; VGA out; DVI-D adaptor card; serial; parallel; Windows XP Professional;
Dimensions: 116 x 363 x 398mm (WDH).

Dell OptiPlex GX620 MT

PRICE: \$1529 (no monitor)

LABS VERDICT

Performance	★★★★★
Features	★★★★★
Value	★★★★★
OVERALL	★★★★★

Finally, we have the big brother of the family: the MT. It has a conventional layout, so the drive bays are positioned horizontally across the chassis; in all the other models, the drives are vertical. It's practical, but less inspiring to look at.

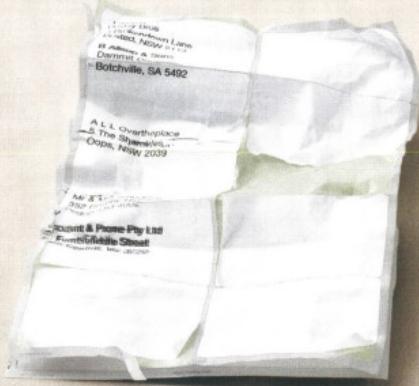
However, it has the widest and simplest range of expansion possibilities. The larger size creates enough space inside for two 5.25in external bays plus a 3.5in, in addition to the hardware for mounting two hard disks. There's also a clear path for air to flow from the massive heatsink and intake fan to the rear grille. However, it hummed noticeably, so we'd want it tucked under a desk.

Like the DT and SF motherboards, the MT has a PCI Express 16x slot for an optional graphics card, but there's room for a full-height card without having to resort to a riser. It also has two full-height PCI slots and is the only machine in the range with a PCI Express 1x slot.

The other key area where it wins is price: the MT represents good value for money for the performance on offer.

SPECIFICATIONS

3GHz Pentium 4 531; 512MB PC4300 RAM; Intel 945G Express chipset; 80GB hard disk; combo CD-RW/DVD-ROM drive; Intel GMA 950 graphics; Gigabit Ethernet; 8 x USB 2; VGA out; serial; parallel; Windows XP Professional;
Dimensions: 190 x 441 x 411mm (WDH).



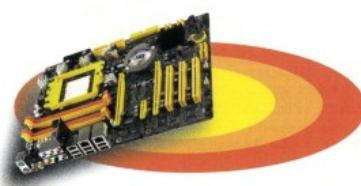
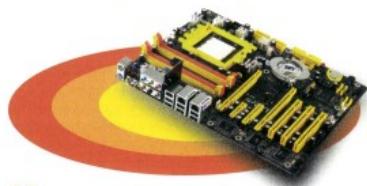
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Nikon D50

PRICE: \$1388 DELIVERY: \$10

LABS VERDICT

Great-value, and with the kit lens it's a better all-in-one package than Canon's competitor.

Performance



Features



Value



OVERALL



Nikon's digital SLR division has been having a tough time of late, with Canon's aggressive marketing stealing much of the limelight. But the new D50, touted as a mass-market entry-level digital SLR in much the same vein as the excellent Canon 350D (*June 2005, page 70*), is a fine product nonetheless.

'Contrary to most other digital cameras, the Nikon accepts SD card storage.'

The D50 is a stripped-down build of the D70 rather than a brand-new model designed more from the ground-up like the 350D. This isn't an inherently bad thing, but it does result in less than cutting-edge headline specifications. Chief among these is the D50's CCD sensor, sporting 'only' 6.2 megapixels, as opposed to the 8 megapixels of the 350D, although it's physically slightly larger, which in theory allows for better detail resolution. Maximum burst rate is marginally slower at 2.5fps – the 350D manages 3fps – and it has a 12-shot buffer in JPEG Fine mode to the Canon's 14.

It's comfortable to hold. It does feel like plastic though. That said, the body is by no means flimsy, and it's no featherweight: with the kit lens and battery, it weighs in at 828g.

Contrary to most other digital cameras, the Nikon accepts SD card storage. This is a clever move in a camera aimed at first-time digital SLR owners: there's a good chance they've already invested in a high-capacity SD card if upgrading from a digital compact. If starting from scratch,

though, you'll still find SD media more expensive than CompactFlash and high-capacity Microdrives, as well as currently being limited to 2GB capacity.

There are a couple of operational quirks that, although trivial-sounding, do have an effect when it comes to obstacle-free picture taking. The main concern is the 'command dial' scroll wheel used to set shutter speed or aperture, depending on shooting mode. This is mounted on the back and operated with the thumb, as opposed to Canon's design, where it's top-mounted just above the shutter and operated with the index finger. If you're trying to use the wheel with the camera to your eye, your thumb gets in the way and you'll have to pull back.

In addition, once you've taken a picture, the Nikon drops into auto-review by default and displays the last shot on the 2in TFT for several seconds. During this time, the command dial is reassigned to scrolling through recorded images; getting it back to its usual function requires a half-press of the shutter release: it's a small operational point, but it wastes time when trying to take an action shot. The D50 does score extra marks by allowing you to alter ISO and white-balance modes while referring to the top-mounted LCD screen, saving aggravation over the Canon, which forces you to look at the TFT for these often-used adjustments. But, inexplicably, metering mode – adjusted at least as often as ISO by many photographers – is relegated to the menu system.

Balanced against these slightly equivocal points are important areas of definite superiority over the 350D. The first is the shutter release. The Canon makes a staccato, squeaky-sounding but unfretted click-whirr. The D50, on other hand, has better damping, making something more akin to a soft 'shoooshing' sound that's far less likely to startle people when you're trying to capture them in a candid pose. Second is the presence of a proper spot-metering mode, covering just 2.5 percent of the frame at the centre. The absence of spot metering in the 350D – the best it can manage is 'partial metering' covering 9 percent of the frame – is a real point against it for some photographers. And if you prefer the fully automatic metering option, the D50's matrix metering system is markedly more difficult to fool, particularly in situations where, for instance, there's a bright band of sunlight falling across a subject. Furthermore, if you like to capture action shots with fill-in flash, the inbuilt flash unit will sync down to 1/500th of a second – over twice as fast as the 350D. Camera startup time is the same for both though – a near instantaneous 0.2 seconds.



▲ The D50 boasts a bright 2in screen.



◀ The newest entry-level digital SLR on the market retains many high-end features.



The perception when it was announced was that the D50 would undercut the 350D. But in most shops and online stores the prices of both the kit and body-only versions of the two rivals are practically identical. For the kit versions, however, this gives Nikon a clear advantage for one simple reason: the 18-55mm Nikkor G ED kit lens, although the same in basic specifications to Canon's 18-55mm EF-S lens, is superior. The ED designation indicates extra-low-dispersion glass, giving fewer chromatic aberrations, and it's noticeably sharper too, more than neutralising the Canon's 1.8-megapixel resolution advantage.

As a picture-making tool, the D50 has a lot to recommend it. If you're looking for a complete digital SLR kit at the best price point and don't already own better-quality lenses, it's superior. For the body-only option, the 350D is more logical and comfortable to use, and it's difficult to ignore those 1.8 million extra pixels, better action-photography and the up-to-date, lighter and more compact body design. The D50 is a great camera, but doesn't quite knock Canon off its pedestal.

David Fearon

SPECIFICATIONS

6.2-megapixel CCD sensor; 3008 x 2000 max res, f/3.5-f/5.6 18-55mm Nikkor G ED lens (27-89mm 35mm equivalent); 2in TFT LCD; shutter speed 1/4000 to 30 seconds plus bulb; 200-1600 ISO sensitivity; +/-2EV exposure compensation; matrix, spot, centre-weighted metering; Li-Ion battery. Dimensions: 133 x 76 x 102mm (WDH). Weight: 620g (body only with battery).

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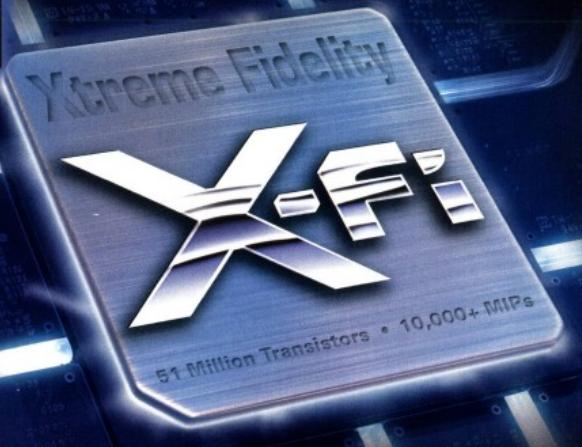
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Canon Digital IXUS 50

PRICE: \$473 DELIVERY: \$22



LABS VERDICT

Great image quality, both for stills and video, all wrapped up in a desirable, well-built chassis.

Performance	★★★★★
Features	★★★★★
Value	★★★★★

OVERALL	★★★★★
---------	-------

Anyone who used the IXUS 40 might wonder how Canon could possibly improve on it, but that's precisely what it has done. For starters, it adds handy features such as a USB 2 interface and compatibility with external flash units. Plus, it now has a 5-megapixel rather than 4-megapixel CCD. But it's the quality of the lens that makes or breaks a camera's images.

Fortunately, Canon has decades of experience at making lenses, and the 3x optical zoom is impressive. It produces consistently great-quality results – our only complaint is a slight softness at the edges. This is one area where the IXUS 50's rival, Sony's DSC-W5, is slightly better for general indoor and outdoor shooting. However, the IXUS 50 certainly doesn't do a bad job; it produced perfectly exposed and nicely saturated images both indoors and out.

The great macro mode captures an area of just 28 x 21mm, while the excellent 30fps VGA movie mode may tempt you away from a DV camcorder. It's incredibly compact, slipping easily into a trouser pocket, and it weighs only 100g. It also uses cheaper, widely available SD cards.

Then there's the range of features. Manual white balance, panorama assist, ISO and EV adjustment are all useful, and you can set focus and metering modes too. We also love the nine-point AiAF system, which shows the focus points that have been chosen. An orientation sensor automatically rotates portrait images, while you can review images at up to 10x magnification.

There's no manual control over shutter speed or aperture, but the My Colours mode allows creativity: you can replicate colour accents in stills and movies. Also, the burst mode is the best we've seen from a camera this size.

The Lithium-Ion battery lasts for scores of shots and we also like the 2in LCD, which is bigger than previous IXUS models. With a quick ready-to-shoot time, just 1.7 seconds, and a shot-to-shot time of about three seconds, you'll never miss a photo opportunity again.

Jim Martin

HP Photosmart R717

PRICE: \$499 DELIVERY: In store only

LABS VERDICT

An attractive price makes the R717 a good choice for undemanding photography.

Performance	★★★★★
Features	★★★★★
Value	★★★★★

OVERALL	★★★★★
---------	-------

In marketing terms, bigger is better, leading HP to use a 6.2-megapixel CCD in the new R717. That sounds superior to its predecessor, the R707, but pixel count is largely academic over 4 megapixels unless you want A3 size.

More important is the quality of the CCD and the lens. On auto settings, indoor shots were well exposed, with good contrast and natural tones. Outdoor photography revealed slight problems, though, with the flash over-kneed in dusky light, and chromatic aberration in high-contrast areas.

There's a big problem with operational speed. The R717 is slow to adjust itself, occasionally refusing to take a shot and compromising its point-and-shoot credentials. The startup time of 5.5 seconds doesn't help, causing you to miss those more spontaneous shots, and a click-to-shoot time of 2.3 seconds left us frustrated.

The LCD is slightly flawed. At 1.8in, it isn't

► Handy hints for each setting make the R717 a good choice.

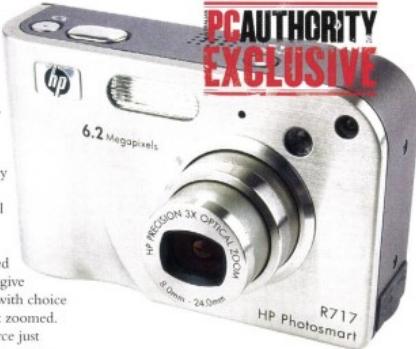
as big as the Canon IXUS 50's (see above) and lacks the generous viewing angles too. When the battery runs low, the R717 disables the screen, forcing you to use the optical viewfinder.

With the 3x optical zoom at maximum, the aperture can be forced at either f/4.9 or f/8.4. This doesn't give much scope for depth adjustments, with choice reverting to f/2.8 or f/4.8 when not zoomed. Elsewhere, the R717 will let you force just about any setting through its intuitive menu system, including colour saturation, white balance and metering method. There's a handy hint to tell you what each setting does, as well as a range of generally effective preset settings for specific shooting conditions.

In use, the R717's design and weight make it comfortable in the hand, and the rugged metal and plastic case will stand up to the rigours of point-and-click life.

The R717 is certainly an improvement over the R707. However, we'd buy the IXUS 50 for its superior image quality, features, slimmer chassis and quicker shoot times.

Clive Webster



SPECIFICATIONS

2864 x 2160 maximum image resolution; 3x optical zoom; 1.8in TFT LCD; shutter speed 1/2000th to 16 seconds; 50-400 ISO sensitivity; +/-3EV exposure compensation; centre-weighted, average, spot metering; 320 x 240 30fps movie mode; 32MB internal memory; SD/MMC card slot; rechargeable Li-Ion battery. Dimensions: 97 x 32 x 59mm (WDH). Weight: 208g (inc battery).

SUPPLIER

Harvey Norman
www.harveynorman.com.au

Sony NW-HD5

PRICE: \$439 DELIVERY: \$14

LABS VERDICT

Great design and excellent battery life are up against frustratingly restrictive transfer options.

Performance



Features



Value



OVERALL



Sony is Apple's nearest rival in the MP3 player market, but it's stuck rigidly to its proprietary ATRAC format, and as a result has lost a good deal of ground. First impressions of the HD5 are good. The rugged metal casing manages to avoid being chunky; it's a touch heavy, but it fits neatly into a pocket. Sound quality is good too, even with the supplied earphones.

Given Sony's history in the market, it's galling to see that it stuck with the proprietary SonicStage software to transfer music, although the player can be used as a standard USB storage device for non-music files. SonicStage isn't bad, though. It's slick and provides innovative ways of navigating your music collection, although it isn't strong on the library-management side.

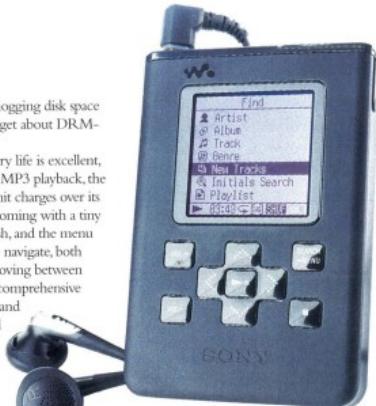
OpenMG, WAV and ATRAC audio formats are also supported, but any other format will be

converted within SonicStage, hogging disk space in the process. And you can forget about DRM-protected files.

There are good points: battery life is excellent, lasting for 26 hours of shuffled MP3 playback, the battery is removable and the unit charges over USB 2 connection, as well as coming with a tiny AC adaptor. It starts up in a flash, and the menu system is quick and intuitive to navigate, both when changing settings and moving between tracks. It also has an unusually comprehensive set of options to define shuffle and repeat options across individual tracks, albums or your entire collection. You can even set the time to detect its orientation and flip the screen and transport buttons.

Sony is still finding the right balance between pandering to the market and driving its own vision, but this is at least a step in the right direction. The HD5 is well engineered and, once set up, a pleasure to use. We'd like to see support for WMA and Windows-level music transfer, but that hasn't stopped iPods from being outrageously successful. With a few extra tweaks, it may not be too late for the long-time market leader to get back in the running.

Ross Burridge



▲ The HD5 is well engineered and easy to use.

SPECIFICATIONS

20GB hard disk; USB 2 interface; removable Lithium-Ion battery; support for MP3, ATRAC and OpenMG formats. Dimensions: 60 x 15 x 90mm (WxDH). Weight: 156g.

SUPPLIER

MP3 Direct 1300 880 128
www.mp3direct.com.au

Sony NW-E107

PRICE: \$219 DELIVERY: \$10

LABS VERDICT

A battery life that defies the laws of physics and a fabulous design make up for idiosyncrasies.

Performance



Features



Value



OVERALL



The MP3 player market seems to be polarising into two camps: long battery-life solid-state players and high capacity (relatively) short battery-life players. And at the heart of this movement is Sony. It was the first company to claim forty and fifty hour battery lives and now claims a whopping 70. Unfathomably, Sony's NW-E107 uses just a single AAA battery.

To reach this three-day longevity though, Sony claims you must use its proprietary ATRAC format. But if you use your PC to rip a CD the default format is Windows Media Audio which is unsupported by Sony (note that Sony cheekily claims WMA and WAV support by re-encoding to ATRAC when transferring – at a loss to audio quality). We always recommend using straight MP3 files as they are universal and will always be supported by most players and computers.

With this in mind we transferred our 200MB of MP3 test files using the chunky SonicStage software. This took a lengthy four minutes and 50 seconds so you won't want to regularly refresh content. The NW-E107, powered by an Energizer Max battery, played these files for 55 hours before dying. While this might be some way behind the claimed 70, it's still hugely impressive and leagues ahead of anything else on the market.

The player itself is incredibly small and light. Although it feels a touch plasticky, at 26g in weight, we forgive it. Sony really seems to have concentrated on ergonomics too. Many people will want to nudge tracks along and adjust volume while the player is in a pocket and the large volume adjuster is perfect for this. To stop, start and change tracks you actually press down on different sides of the fascia – a great space-saving idea.

Opposite the volume is a mini USB port and hold switch. The backlit, mono display is only one line high but is adequate. Two small buttons at the back let you toggle between shuffle and repeat modes, and fiddle with the treble and bass.



▲ Sony's MP3 players lead the market in terms of battery life

The bundled Sony headphones are perfectly adequate for target users.

Our favourite solid-state players are still the feature-rich iRivers (see August 2005, page 81). However, the long battery life, AAA battery, ergonomics and weight make the NW-E107 a very tempting alternative.

Nick Ross

SPECIFICATIONS

1GB solid-state memory; USB 2 interface; AAA battery; support for MP3 and ATRAC formats. Dimensions 56 x 19 x 56mm (WDH). Weight 26g

SUPPLIER

Bargain 1300 388 688
www.bargain.net.au

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Camera phones

**Can you ditch your compact digital camera yet?
We test the latest batch of phone cameras to find out.**

In much of the developed world, camera phones are outselling dedicated digital cameras. Certainly digital compacts aren't advancing as fast as they once were – there's relatively little difference between a four megapixel and eight megapixel compact's pictures, as quality is limited by the lens sizes and few people print higher than 7 x 5in photos anyway. People also don't like the vast files sizes that come with an eight megapixel photo – especially if a three megapixel camera

can still generate acceptable 10 x 8 inch prints. As we see with Canon's IXUS 50 (page 63), the best compacts are small, fast and offer more features. But how far away are camera phones? Samsung has produced a seven megapixel version though it won't be available here for some time. While we consider three megapixels to be the minimum requirement for a decent camera, two megapixel units are the most popular in Australia – perfectly adequate for the popular 6 x 4 inch size.

We asked the main manufacturers to provide their best performers and Nokia, O2, Sony Ericsson and Motorola obliged.

We tested each one by taking an outdoor shot, well-lit indoor shot, night shot and video clip – common or garden pictures that would typically be blown up to 6 x 4 inch sizes. We also tested how easy it was to share them via Blue Tooth. Note that these scores reflect the camera component, not the phone itself.

Sony Ericsson K750i

LABS VERDICT

A clear winner. Pictures are impressive at 8 x 10in and handling them is a dream.

OVERALL



Impeccable timing from Sony Ericsson saw the company launch its update on the galactically popular T610 this month. And it just so happens to sport Australia's first two megapixel camera.

The initial upgrade, the bulky K700i, set few hearts a-flutter but the K750i is similar in size and feel to the original. It also discreetly crams in a wealth of extra features. The screen is much brighter and faster to update. The colours are better. There's a 3D processor and some excellent new games. More importantly there's a MemoryStick Duo slot to house all your multimedia files – essential considering that the 1632 x 1224 photos take up around 500KB each.

A 'flash' LED light (which glows brighter when the shot is taken), did an excellent job when taking

photos in a dark room. Range might be limited to less than a couple of metres but exposure was correct. Using night mode helped further, though pictures were noticeably grainier. However, anything less than a very steady hand will lead to blur.

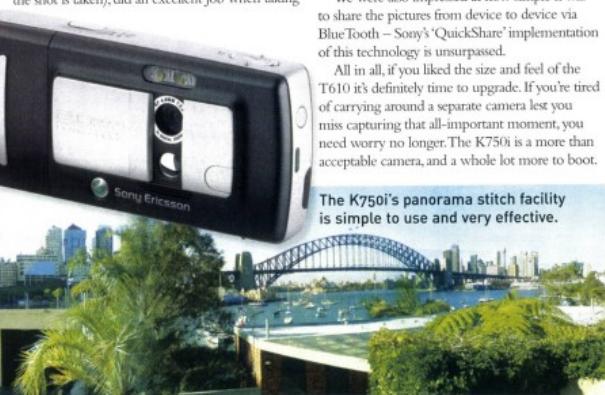
Well-lit and outside shots were very good, occasionally being impossible to distinguish from a dedicated camera. Grain on 6 x 4 inch prints is negligible and 10 x 8 inch prints were perfectly acceptable at arms length.

One the most notable of features is the Panorama mode, which works a treat. Taking three shots and automatically stitching them together makes for excellent vistas, though lining up with the previous image can be tricky in bright light.

At two-megapixels, autofocus becomes a necessity and it's accessed by an initial half press of the shutter. With such a small screen though, it's difficult to check that focus locked on correctly, and we still recommend taking several shots of important subjects lest you discover serious blur later on.

We were also impressed at how simple it was to share the picture from device to device via Blue Tooth – Sony's 'QuickShare' implementation of this technology is unsurpassed.

All in all, if you liked the size and feel of the T610 it's definitely time to upgrade. If you're tired of carrying around a separate camera lest you miss capturing that all-important moment, you need worry no longer. The K750i is a more than acceptable camera, and a whole lot more to boot.



The K750i's panorama stitch facility is simple to use and very effective.



Sony Ericsson managed excellent colour reproduction and low grain under all lighting conditions.

The K750i even has a macro mode for extreme close-ups.



Motorola V635 Nokia 6680

LABS VERDICT

Nothing new for old Moto users, but it offers excellent colour reproduction in outdoor shots.

OVERALL



The latest Moto clamshell won't surprise previous model users; it's the same old stuff yet again. The camera itself is 1.3 megapixels and also sports a flash light. If you want to take pictures of yourself it has a low-res LCD screen on the top which can be used as a mirror. Extra storage comes from a Micro SD card, though having to rip off the top facia is a fingernail-busting struggle – what price a slot in the side?

But photo-quality was surprisingly high. Our outdoor shots offered excellent colour reproduction and crisp detail. This lessened as we moved indoors where pictures became more washed out the darker it got. The interface, especially Blue Tooth sharing, needs work. But for 6 x 4 inch prints, it's not bad at all.



	Nokia 6680	Motorola V635	O2 Xphone IIm	Sony Ericsson K750i
Price without contract (rrp inc GST)	\$1099	\$690	\$649	\$659
General				
Dimensions W x D x H (mm)	55 x 21 x 108	49 x 25 x 89	47 x 20 x 108	46 x 21 x 100
Weight (g)	133	133	107	99
Camera resolution (megapixel)	1.3 plus 640 x 480 VGA	1.3	640 x 480 VGA	2
Picture resolutions	280 x 640; 640 x 480	1280 x 960; 640 x 480; 320 x 240;	640 x 480; 320 x 240; 160 x 120	160 x 120; 480; 160 x 120
Assist lamp	Y	Y	N	Y
LCD display size	3.5 x 26	3.0 x 33 (16 x 16 external LCD)	3.5 x 26	3.1 x 27
W x H (mm)				
Mirror	N	External LCD	Circular	Circular
Digital zoom	3x	8x	4x	N
Exposure				
White Balance	Auto and preset	Auto and preset	Auto and preset	Auto and preset
Exposure compensation	N	/- 2EV	N	/- 2EV
Shoot modes				
Low Light	Y	Y	Y	Y
Burst	6	N	N	4
Panorama	N	N	N	Y
Macro	N	N	N	Y
Timer	Y	Y	N	Y
Movie Mode				
Resolution	176 x 144; 128 x 96	176 x 144; 128 x 96	176 x 144; 128 x 96	176 x 144; 128 x 96
Storage				
Internal Memory	10MB	5MB	32MB	38MB
External Card	Mini SD	TransFlash/MicroSD	Mini SD	MemoryStick Duo
Effects				
Black & White	Y	N	Y	Y
Negative	Y	N	N	Y
Sepia	Y	N	Y	Y
Solarize	N	N	N	Y
Other Features				
Brightness; contrast; tone	N	Brightness; picture frames	Picture frames; time and date imprint	

LABS VERDICT

Small for a 3G compatible phone is a plus, but a camera replacement this phone is not.

OVERALL



Nokia's offering feels large but is quite small for a 3G phone. It also sports a second self-portrait camera though this is for video calls. Pictures can be usefully stored on a side-mounted Mini SD card.

Though bulky, we liked the fast refresh rate of the big screen which was slightly better than others on show. Navigation and Blue tooth dissemination is well laid out and using the camera is great.

Colours in our outdoor shots were good, though even well-lit scenes came back blurred more often than not. This worsened noticeably as things got darker where even the 'flash' couldn't help sharpen the focussing. The self-portrait camera, offers a noticeable increase in grain but wouldn't be used normally. Ultimately, while it's a good phone, it's no real camera replacement compared to the Sony Ericsson.



LABS VERDICT

A valiant effort, although this one is firmly in the phone not the camera category.

OVERALL



O2's phone is the smartest of the lot without being a full-on smart phone. It runs Windows Mobile making it feel more like a PDA, but accessing the key functions soon becomes intuitive. It's the only phone without a flash, but even this would not rescue the poor picture quality.

Our outdoor scenes sported distracting vignetting in the corners. Colours were washed out and suffered from colour casts, while detail capture was incredibly poor.

On top of this, no matter what environment we took photos in, the results came out blurred when we viewed them on our PC's monitor.

As a final nail in the coffin, moving the pictures around via Blue tooth proved an arduous task, as every picture required a full search for compatible devices without remembering what was there. Not a camera replacement at all.



We found it tricky not to blur photos taken with Nokia's 6680.

O2's phone missed detail and suffered colour casts even under ideal conditions.



We were impressed with the colours and the crispness of Motorola's V635.



TOSHIBA GIGABEAT F20

PRICE: \$376 DELIVERY: \$14

LABS VERDICT

Toshiba's new foray into MP3 players offers good hardware and features, but awkward operation.

Performance
Features
Value for money

**OVERALL**

With an almost total lack of decent, high-capacity, WMA-compatible players appearing on the market we were beginning to think that the iPod's competition had given up. We haven't seen a truly competitive one since the Rio Karma.

The F20's aluminium case is solidly built and light at 160g, and it looks good. But, like iRiver and Creative before it, Toshiba has (wrongly) thought that Apple's touch control is best for navigation. The touch-sensitive rubber cross, might improve individual track selection but scrolling through vast file lists is a chore. Still, we like the separate power, menu, volume and multi-function 'a' button at the sides and the hold switch at the top. A remote is bundled with the 40GB and 60GB versions.

With these and the outstanding 320 x 240 colour screen, navigation should be a breeze, but it's anything but. The menu system is far from intuitive, and it's actually not possible to return to the 'now playing' screen once you've moved away from it. At least transferring music is simple as it's compatible with Windows Media Player 10 (far more preferable to the chunky 'gigabeat room') and our 200MB of MP3s transferred in a speedy 40 seconds. But battery life is mediocre compared with Sony's 26 hour HD5. It played shuffled MP3s for 14 hours.

The bundled earbuds sound very good, providing good treble and punchy bass. Tinkers can play around with the gimmicky SRS WOW audio enhancements, but more people will appreciate the inclusion of simple treble and bass adjustments. The bookmark feature is also potentially useful.

But the killer feature is the ability to transfer photos directly onto the player from a digital camera. We've only seen the bulky iRiver H320 (August 2005, page 84) player do this before. Like the H320, transfer is by USB 1.1 – but if you're



► Toshiba's iPod wannabe looks great, sounds great but also frustrates.

on holiday you can empty your memory card over dinner.

Unfortunately, images can only be displayed once they pass through the gigabeat room software. Still, the absence of direct transfer was a major criticism of the iPod Photo.

All in all, there are some great features but you feel Toshiba hasn't spent much time actually using their own product. A future firmware update could solve many ills but until then, the fiddly and unintuitive operation prevents the F20 getting an award.

Nick Ross

SPECIFICATIONS

20GB hard disk; USB 2 interface; fixed Lithium-Ion battery; support for MP3, WMA and WAV formats. Dimensions 63 x 16 x 106mm (WxDH). Weight 166g

SUPPLIER

Mini Digital 1300 659 046
www.minidigital.com.au

TENEBRIL SPYCATCHER 3.5

PRICE: US\$20

LABS VERDICT

Phishing protection and aggressive spyware disinfection impress, slow scanning doesn't.

Ease of use
Features
Value

**OVERALL**

The effectiveness of spyware-scanning software can be measured by a combination of depth, accuracy and speed. We use the three established market leaders as comparison: Lavasoft Ad-Aware, SpyBot S&D and our current favourite, Webroot Spy Sweeper. Unfortunately, SpyCatcher fell significantly behind on both depth and speed. Despite scanning only 82,120 items on our testbed machine, this took a laborious 11 minutes, 16 seconds (compared to two minutes, 46 seconds and five minutes, 18 seconds).

In terms of accuracy, though, there's no denying the effectiveness of SpyCatcher, as it managed to spot all the pre-installed spyware on our testbed. It automatically updates itself during the initial online activation process too, ensuring you get up-to-date protection, and then



► SpyCatcher goes way beyond simple spyware scanning.

downloads new definition files as they become available. SpyCatcher also provides one-click access to the Tenebril online spyware database, and items can be tagged as 'allowed spyware' to prevent future redetection. This is just as well, as it identified a harmless printer-sharing utility and some file-updating executables as spyware. Luckily, if you do disable a file by mistake, a copy is created of everything SpyCatcher removes.

We also like the ReInstall Shield, which negates the problem of spyware embedding instructions at the start of the Windows boot to reinstall files you thought had been deleted. It disables rogue executables and locks them down in a satellite file that's run at the start of the boot sequence. This also enabled certain adware-supported apps to run by fooling them into thinking the ad-server component was still there.

A clever anti-phishing feature doesn't use a blacklist approach, but compares the phisher site with the real site in real-time. But what impressed us most was the depth of user control over the program. Comprehensive scheduling options and system logging, which includes an option to email plain text, HTML or XML format reports to specified users, are the icing on the cake. However, its slower scanning speed, high false-positive rate, and slightly expensive price prevent it toppling Webroot Spy Sweeper.

REQUIREMENTS

Windows 95 onwards.

SUPPLIER

Tenebril online only
www.tenebril.com



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Solid aluminum design
Multiple power supply (USB Battery, AC/DC)
Incredible rich sound



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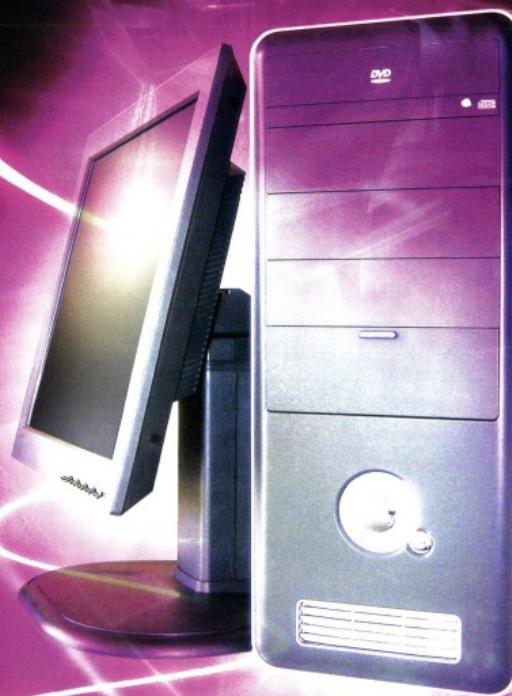
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• Avatar 3200A

• Invader 5050A

• Phoenix 1050A

PC USER - 2005 Sep Issue

• Phoenix 1050A

ScanSoft PDF Converter Professional 3

PRICE: \$139 [quote code PCA002] DELIVERY: \$12

LABS VERDICT

A great-value utility for handling PDF-related tasks, but it doesn't always hit the mark.

Ease of use



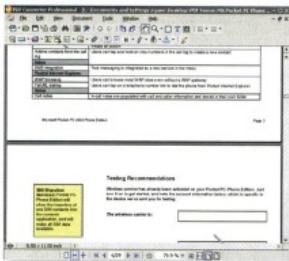
Features



Value



OVERALL



You can now edit PDFs without converting them.

and re-import it with no noticeable changes.

Nevertheless, the overall fidelity of converted jobs is acceptable for Word docs, although we found it less forgiving in Excel worksheets. Other improvements are thin on the ground, but include speed enhancements, making some of the complex tasks more practical on older systems.

However, the big new feature is FormTyper, making it possible to create PDF forms that contain editable fields to be filled in onscreen.

FormTyper is also able to analyse a document or existing PDF form using Optical Character Recognition (OCR) and 'intelligently' insert editable fields, as well as append your signature. It's a great idea, but is gruellingly slow and not universally effective. In our tests, which included some taxation forms, it identified many fields, but also misidentified field labels as fields. You can manually enter the skipped fields, but this defeats the purpose. Another useful feature is the ability to directly edit PDF files without having to convert them into Word format first, although this means that authors who want their PDFs to remain unaltered will need to password-protect them.

Compared to Adobe's own PDF offerings, this bundle continues to offer excellent value for money, while still boasting some unique and powerful features. As such, it's a useful tool to have in your armoury, but it's ultimately too hit and miss to rely on exclusively.

Roger Gann

REQUIREMENTS

Windows 2000/XP

SUPPLIER

Advance Software 1300 733 403
www.advancesoftware.com.au/pca

The latest release of ScanSoft's PDF tools bundle, it consists of PDF Create! 3 and PDF Converter 3. The first lets you generate PDF files from any Windows application via a custom PDF 'printer driver'. The installation also adds an extra menu and toolbar to Microsoft Word, Excel and PowerPoint, making the creation of a basic PDF as easy as printing a document.

PDF Converter converts PDFs into a word-processing format for editing. Previously, you could only convert PDFs into the Office DOC format, but you can now convert them into WordPerfect WPD format too. You can even add mark-up comments and stamps. Format retention remains good rather than perfect, with still some way to go before you can export a document out to Word.

Spam Buster

PRICE: US\$19.95 DELIVERY: Free

LABS VERDICT

Spam Buster looks old and tired when compared to other applications that do more.

Ease of use



Features



Value



OVERALL



Pie charts look pretty but don't reflect the false positives caused by restrictive default settings.

which has a negligible false-positive rate. Spam Buster flagged just about everything as spam during our initial testing, but despite our best efforts, we never once managed to get the false-positive rate down below a disappointing 9.8 percent. The A-Listed F-Secure Internet Security Suite had a false-positive score of 2.7 percent when tested, and the Outlook-integrated InBoxer just 0.4 percent.

Where we can praise Spam Buster is its excellent statistical reporting: pie charts of spam percentages, graphs showing spam trends, users and domains that have spammed you most, and even a historical archive of all spam received with details of dates, senders and subjects. But even if the spam detection itself wasn't so overzealous, these historical logs are useless without a built-in search function or an export facility. There's no mail-client integration either, as Spam Buster is a standalone application polling your mailboxes, displaying them for assessment before deleting from the server and firing up your mail client for spam-free collection.

But even if you accept this additional mail-process layer, it's beaten to the punch by the far superior MailWasher (www.mailwasher.net). Spam Buster can poll only a maximum of 12 POP3 mailboxes (no webmail support here) – in itself something of a limitation, but one that's made more serious because you can't poll them simultaneously.

Given this, it's quicker to delete spam from your inbox yourself.

Davey Winder

SPECIFICATIONS

Windows 2000/XP

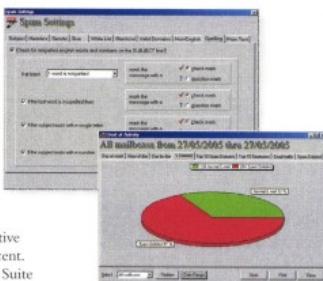
SUPPLIER

Contact Plus
www.contactplus.com

From the outset, the primitive interface of Spam Buster has a dated feel.

Unfortunately it's matched by much of its feature set and it doesn't compare well with contemporary anti-spam options. It's not helped by the sledgehammer tactics, either: by default, non-plain text messages are marked as spam, siphoning off every HTML email. It also assumes misspelled words on the subject line makes for spam. Worse, by attempting to cover all bases Spam Buster becomes unnecessarily complex to configure. It requires much more ongoing tweaking than a Bayesian filter such as POPFile (<http://popfile.sourceforge.net>), which works effectively after a week and is free.

Now can it match the out-of-the-box success of something like InBoxer (www.inboxer.com),



RSS roundup

Davey Winder reviews the must-have RSS Aggregators.

Awasu (Personal Edition)

OVERALL ★★★★☆

PRICE: Free

DOWNLOAD FROM:

www.awasu.com

DOWNLOAD SIZE: 4.5MB



Awasu isn't the fastest of applications, but it does come with good links to Feedster, Technorati, NewsIsFree and Syndic8 built in. Unfortunately, this free version is limited to 100 channels, three plug-ins, three search agents and hourly updates. The default plug-ins include a Google search string monitor, but others are available that will monitor a POP3 or IMAP mailbox, save feed content directly to a MySQL database and allow the operating of Awasu as a podcast client for iTunes. A lack of pop-up blocking means the HTML display is littered with ads, but brief excerpts or plain-text options fare better. Recently viewed feeds are remembered and recalled from content tabs, and you can even switch the embedded browser from IE to Mozilla, such is the configurability on offer. It's an exceptional, free standalone client.

NEWSGATOR

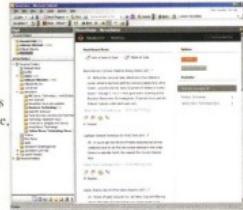
OVERALL ★★★★★

PRICE: From US\$20 per year

DOWNLOAD FROM:

www.news-gator.com

DOWNLOAD SIZE: 2.5MB



There are many versions of NewsGator available, but the standard business plan we cover here includes web-based access and the excellent Outlook Edition – outstanding for under \$2 per month. Integrating tightly with Outlook, newsfeeds are treated like any other mail item, so can be organised using the same directory structures and search folders, forwarded with a click or two and, if you use Exchange Server, dropped into public folders as well. The familiarity aspect shouldn't be overlooked, as it means you hit the ground running when it comes to exploiting the benefits of RSS content. Content can be displayed alongside your email in headline or summary form, or in a NewsGator 'today' style pane if you prefer. NewsGator has recently acquired the FeedDemon desktop client, which will also become part of the basic business package soon, making it exceptional value for money.



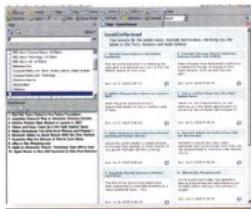
FeedDemon 1.5

OVERALL ★★★★★

PRICE: US\$30 / \$39

DOWNLOAD FROM: www.feeddemon.com

DOWNLOAD SIZE: 2.45MB



Sage 1.3.5

OVERALL ★★★★★

PRICE: Free

DOWNLOAD FROM: <http://sage.mozdev.org>

DOWNLOAD SIZE: 100KB



Pluck

OVERALL ★★★★★

PRICE: Free

DOWNLOAD FROM: www.pluck.com

DOWNLOAD SIZE: 4.95MB

Developed by the people responsible for the TopStyle CSS Editor and HomeSite HTML Editor, FeedDemon brings the same ease of powerful access to RSS aggregation. One click changes content display between newspaper headline style to plain text or boxed HTML columns. Every newsfeed can have the display that suits it, and you, best. Special 'watch' channels can be configured to filter incoming feeds by keyword and make matching content available immediately. Pop-up blocking, a tabbed web browser and search channels that integrate with Feedster and del.icio.us only add to the attraction.

Although the Firefox browser already comes with newsfeed support, if you're serious about RSS (and Atom for that matter) then the Sage extension is an essential download. The total integration with the browser client is impressive, using bookmarks for the storage index and enabling you to subscribe to feeds using the Firefox orange Feed Indicator icon. The newsfeed rendering is controlled by CSS and is fully customisable, although you'll need to get stuck in and do this manually. Everything about Sage is slick, clean and efficient. If you use Firefox, Sage for RSS is a must-have.

Both versions of Pluck are free: the browser-independent web version and the Internet Explorer-integrated option. Complete with an auto-detect RSS feature, 15-minute feed updates, the ability to add user annotations and offline reading capability, the IE option is the better bet. Display modes are limited, but both Digest view and List view work well. The killer application for this IE version is the persistent search, or Perch as Pluck calls it. As well as checking RSS feeds for articles that match keywords, you can set up a Perch to scour, sort and filter product queries for eBay and Amazon. Pluck is as good as it gets for IE.

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WIRELESS BROADBAND:

BEST OF BOTH WORLDS

Wireless broadband is a relatively new term on the Internet landscape but it's catching on fast. And why wouldn't it? The promise of high speed access, without cables or phone lines, and charged like an ordinary broadband package, is like manna from the air waves for most of us. So what is it and where can you get it?

THE WAN WAY

There are three types of wireless broadband: high speed wireless Internet access over a wide area network; high speed access over public wireless 'hotspots' and broadband over a wireless LAN in the home.

While there are far fewer wholesale providers of wide area (city-wide) wireless broadband compared to its wired counterpart, competition is expected to increase over the next 12 months.

At present both provide metropolitan services in Victoria, New South Wales and Queensland.

Wide area wireless broadband works in a similar fashion to your home wireless

network just on a larger scale. It uses a series of high-powered base stations to wirelessly transmit data received over traditional ADSL or cable Internet. By having multiple base stations with powerful antennas scattered across a city, wireless access can be provided over a large area and subscribers can stay connected as they move within the network. And, in the case of iBurst, if they are in a moving vehicle.

While some providers require a special modem located in a home or business, iBurst enables subscribers to use a wider range of modems – including models from the likes D-Link – and to be mobile.

Data speed ranges from a slow 64Kb/s downstream and 32 Kb/s upstream to a respectable 1Mb/s downstream and 345Kb/s upstream. However, just as some mobile phone services suffer from interference, so too is wide area wireless broadband affected by large buildings and geographical obstacles causing signal weakness or drop out.

The major benefit of this type of service is that it can provide broadband Internet access where ADSL or cable are not available and unlike the traditional fixed line or cable services, it is a simple process of moving your modem if you change addresses.



D-Link's DSL G604T rolls your ADSL modem, router and gateway into one handy device.

Wide area wireless broadband has grown rapidly in the last 12 months and IDC predicts there will be 70,000 subscribers by the end of this year. Wireless broadband is expected to be the fastest growing broadband category over the next five years and is expected to attract major players such as Optus, Telstra and Vodafone.

HOTSPOTTING

Wireless broadband provided by public wireless 'hotspots' also is gaining in popularity. In this case Internet access is provided to several people at a time, usually from a single base station situated in a public area such as an airport lounge, coffee bar or even a McDonald's restaurant. It provides a convenient service for collecting email or general web surfing but because it is a publicly accessible network, it is not secure.

'The devices are cheap and easy to set up and encrypt so others cannot easily access your network without permission.'

HOUSEBOUND

One of the fastest growing and most popular forms of wireless broadband is the home wireless LAN. Using an ADSL or cable wireless router, such as D-Link's DSL-G604T ADSL/Wireless Router, or a wireless access point such as the new D-Link AirPlusXtremeG DWL-2100AP Wireless Access Point, home users can use a single ADSL or cable connection to access the Net from anywhere in the house on any device that has a wireless adaptor.

D-Link wireless devices utilise the 802.11a and g standards which offers greater data speed and security than the original 802.11b standard. The devices are cheap and easy to set up and encrypt so others cannot easily access your network without permission.

But you don't have to use your wireless network just for accessing the Net. You also can use it for sharing devices including printers or multimedia content such as streaming audio and video.

With a wide variety of adaptors and access points available from D-Link, you can have a stand alone wireless network or one that combines wireless and wired Ethernet.



Have more than one printer? D-Link's DP-321 lets you share up to three printers on a network.

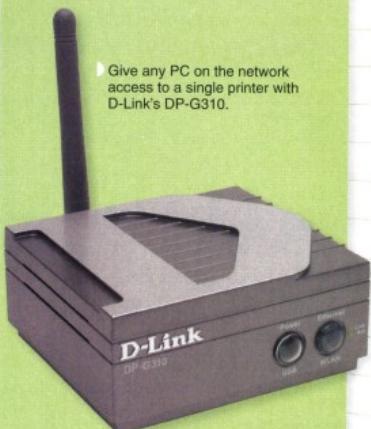
POOLING RESOURCES

Sharing printers and other services over a wireless network is now second nature if you have the right equipment and there are plenty of options to suit your circumstances.

You can go for something like the top of the range D-Link AirPlusG DI-824VUP+ which is an 802.11g wireless VPN (virtual private network) router that combines broadband Internet sharing with robust VPN firewall security, print server and built-in 4-port switch for ready printer and workstation connection. It's designed for office users and includes both bi-directional parallel and USB printer connectivity over a secure, fast wired and wireless network.

Alternatively you could opt for the D-Link DP-G321 Wireless Multi-Port Print Server, which is used in conjunction with a D-Link access point and has two USB 2.0 ports and one parallel port, allowing everyone on your network to share up to three printers.

For home users there is the D-Link DP-G310 Wireless Print Server which has a single USB port so you only need one printer for the whole house, because it becomes part of your network and everybody on your wireless network can access it.



Give any PC on the network access to a single printer with D-Link's DP-G310.

D-Link
Building Networks for People



Control and manage access to your network with the DSA-3100 Network Access Control System.

Do it yourself

Setting up your own public or private wireless hotspot requires reliable and robust equipment.

The new D-Link DSA-3100 Public/Private Hot Spot Gateway is an Ethernet-based gateway specifically designed to provide free or fee-based broadband connection to the public or to a company's employees while providing a separate and secure private network that shares the same Internet connection.

It can be turned into a wireless hotspot with the addition of a D-Link access point or add a D-Link switch and your back office computers and printers can share the same broadband connection.

The DSA-3100 is a Network Access Control System (NACS) that intelligently manages authentication, authorisation and accounting for all wired and wireless network users. It can handle up to 250 user accounts in its internal database and supports at least 50 users on-line at any time.

If yours is a fee-based hotspot you will need the new D-Link Airspot DSA-3100P Ticket Printer which communicates with the DSA-3100 Public/Private Gateway to generate and print log-in usernames and passwords for the hotspot customers.

With the DSA-3100P, the DSA-3100 gateway can manage and store up to 2000 user accounts in its internal database and support up to 50 logged-in users at any time.

ONE INTERNET ACCOUNT, MULTIPLE PCS.

Setting up your wireless network to share broadband Internet access at home, school or in the office is a simple process nowadays. Once you have your broadband accounts all you need is a wireless gateway such as D-Link's DSL-G604T.



Tri-mode adapters like the AirPremier AG DWL-AG660 are necessary if you want to stay covered in any wireless network.

It's an ADSL Router designed for home or office use that incorporates a Telstra-approved ADSL modem with an Ethernet and wireless router. It comes with four Ethernet ports and provides an 802.11g high-speed (54 Mb/s) wireless LAN for ready connection to wireless users. The firmware can be upgraded to support new DSL standards, including ADSL2, ADSL2+ and reach-extended ADSL2 (RE-ADSL2), providing

compatible with 802.11a, b and g standards.

Its four Ethernet ports also allow it to be connected to an ADSL or cable modem and share broadband Internet access over a wired LAN giving it true versatility.

D-Link also provides the wireless adaptors for desktop and notebook PCs enabling them to join your network. The D-Link AirPremierAG DWL-AG530 Wireless PCI Adapter is a

'Setting up your wireless network to share broadband Internet access is a simple process nowadays.'

better speeds, longer distance coverage, reduced power consumption while maintaining ADSL's always-on functionality.

Alternatively, if you have an iBurst broadband wireless account you could use the new D-Link AirPremier AG DI-784 11a/11g Dualband Wireless Router. This four-port, tri-mode, dual band router provides users with data transfers rates of up to 108Mb/s.

The DI-784 works simultaneously on both 5GHz and 2.4GHz frequencies and is

tri-mode, dual band adapter that enables desktop PCs to connect to any one of three available wireless networks – 802.11b, 802.11g and 802.11a – while the D-Link AirPremier AG DWL-AG660 Wireless Cardbus Adapter does the same for notebooks.

The DWL-AG530 is ideal for a PC requiring multi-mode access.





Portable wireless connectivity

Use it in conference rooms, hotel rooms, or even at hotspots.

The D-Link AirPlus[®]G DWL-G730AP is a portable and convenient wireless solution for the traveling business person delivering 802.11g wireless connectivity with a maximum wireless signal rate of up to 54Mb per second*. Use it in conference rooms, hotel rooms, or even at hotspots.

The Wireless Pocket Router/AP (Access Point) might be small in size, but is huge in functionality. The DWL-G730AP supports multiple operation modes including: **Access Point (AP) mode** to create a wireless connection; **Router mode** to share an Internet connection; and **Wireless Client mode** to connect an existing wireless network. Easily switch between these modes by using the 3-way configuration switch located at the bottom.

Easy to pack and convenient for traveling, the DWL-G730AP comes with an attractive traveling case which also provides accessories including cables and a power adapter. Increase productivity and enjoy the benefits of wireless connectivity while on the road with D-Link's Pocket Router/AP.

For more information contact D-Link on **1300 700 100**

Learn more about D-Link Wireless: www.dlink.com.au
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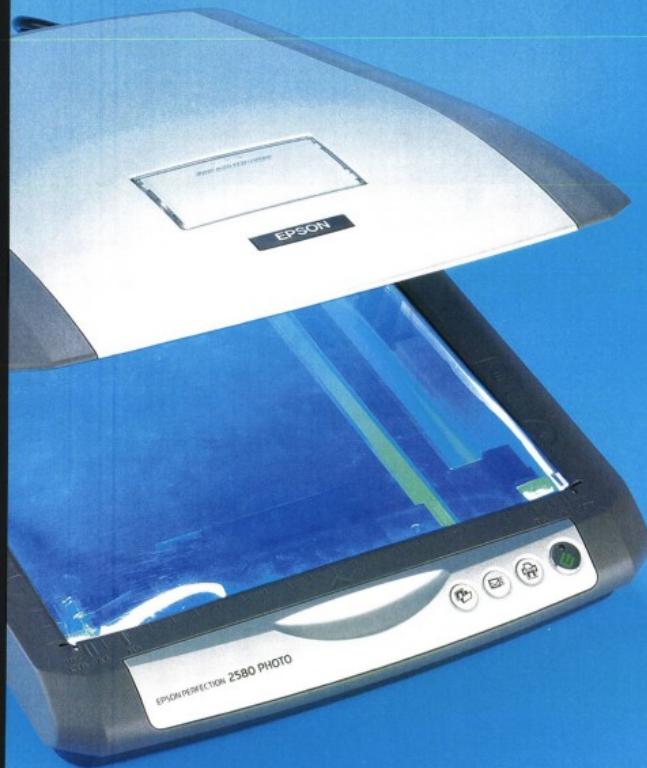
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Scanners

Are multifunction devices replacing the need for scanners?
We tested five budget models and three top film scanners to find out.

With film now almost universally replaced by digital imaging, scanners remain a valuable resource for keen photographers who want to archive and share prints and negatives. Not only that, but budget scanners are ideal for scanning documents for editing, OCRing or copying (in conjunction with a printer). However, with MFDs becoming ever more popular, the need for stand-alone scanners is diminishing. But does a lightweight stand-alone version offer advantages over a hulking great MFD?

This month, we've rounded up the cream of the sub-\$300 crop, and have found scanners that not only excel at scanning reflective

media (such as prints), but are also surprisingly competent at converting your old negatives into printable images. All five scanners are capable of scanning prints at a perfectly acceptable resolution – the real test is whether they can handle 35mm negatives and slides.

As you can see from the quality results table (see page 88) we had mixed results. None approach the output that can be achieved with a dedicated film scanner, but we had no major complaints about either the Epson or the Canon's results. But if you'll mainly be scanning negative or positive slides, we've also looked at three film scanners (see page 84).

We tested each flatbed scanner's capability

to restore faded and damaged photos. This is primarily a test of the software, and our results show that there are some serious improvements on offer for the minimum of effort. See How we test on page 86 for more details. We've assessed the quality and capabilities of each software package, too.

So, whatever your scanning needs, there's something on test for you over the next few pages. Unlike the budget units of a few years ago, there's some great quality on offer, so read on to find out which models scoop the awards.

LABS EDITOR: Nick Ross

CONTRIBUTORS:

Dave Stevenson, David Fearon

Epson Perfection 2580 Photo

PRICE: \$279 DELIVERY: \$15-\$20

**LABS VERDICT**

Excellent quality and innovative slide-scanning capabilities coupled with an average price.

Speed
Quality
Features
Value

**OVERALL**

Epson is well established as one of the leaders of the home photography market. The RX800 inkjet delivers the best-quality photos in the consumer market and we commended the RX620 multifunction device precisely because of its photo printing and scanning capabilities.

Epson continues its current run of form with the Perfection 2580 Photo, which stormed the Labs this month. Offering not only superb quality and the fastest scan times of any device on test, it's also great value for money and boasts some excellent features. It's one of the larger models on test, because of its integrated (and automatic) film loader and the extra backlight in the lid for scanning transparent media.

Scanning reflective originals was incredibly quick, thanks to a combination of solid

in both light and dark areas.

If you want to restore a box of faded prints to their original glory, the 2580 is for you. Selecting the colour restoration checkbox removed the red cast from our test print and produced natural-looking skin tones, while plenty of detail was retained. There's no scratch-removal tool, but the colour-restoration tool again effectively removed the sepia tint on our black-and-whites.

The 2580 also offers good document-scanning capabilities. An A4 sheet of text scanned in



► Features such as auto exposure and fading correction make life easier when scanning prints.

The 2580 has some impressive film-scanning capabilities too. The integrated automatic film loader makes this the easiest and quickest film scanner on test – just open the hatch on the top of the lid, slide in the film and click Scan. The driver will automatically break a strip of negatives into individual images, and the 2400ppi optical resolution means you can easily print frames at A4 sizes – even at A3 with a bit of sharpening. There's a dust-removal tool in the driver interface to ensure that scans are clean and free of specks.

Resulting scans were a little warm for our liking, but with so many accessible image controls in the driver, correcting them was simple. The only real niggle is that the small preview window makes it a job more easily done in an editing application. A handy feature is that you save your settings and switch between them depending on what's being scanned. Slide-scanning features are a little less sophisticated, with just a single 35mm slide adaptor; but as with negatives, we saw decent quality results.

Overall, the Perfection 2580 Photo is a great all-round scanner. Although the HP is slightly better at scanning prints and the Canon is marginally superior where negatives are concerned, the Epson strikes a decent balance between the two.

only ten seconds at 150ppi, and produced clear characters against a solid white background. If you're scanning large books, the lid of the 2580 is removable to allow for thicker media.

Once scanned, you can convert your documents to editable text using the bundled ABBYY FineReader 5 Sprint. ArcSoft's PhotoImpression 5 takes care of image editing, while a business card app lets you scan and manage contact details.

The 2580 is a good choice for both beginners and advanced users, thanks to a well-designed TWAIN driver. Those after a quick scan with minimum fuss can select the fully Automatic mode, while the Professional mode provides access to the full range of image controls. A Home mode provides a comfortable mixture of the two.

Professional mode opens a considerable number of features, including the unsharp mask tool. You can also change the tone curve, colour balance, brightness, contrast and saturation. There's also adjustable gamma to optimise brightness without sacrificing detail. In fact, the driver is the best featured on test. Auto image rotation, auto exposure and adjustable gamma mean that enthusiasts will have control over their images.

► Scanning negative strips is simplicity itself with the Perfection 2580 Photo.

**SUPPLIER**

Ai Tech Computer {03} 9523 1322
www.pc.net.au

19 inch LCD Monitors – Best Buys

Polyview V293

**pc world
BEST BUYS**

The PolyView V293 is a terrific screen for everyday use, watching movies and even playing games. It has a very low price tag of \$499, yet provides excellent contrast, brightness and colour reproduction.

If you've read the very low price at the bottom of this report and thought to yourself "it just can't be any good if they're giving it away at that price", then we're here to tell you that this monitor is indeed the best bargain in the entire round-up.

For \$499 you get a screen that has both VGA and DVI inputs and one which also has a reasonable 21ms pixel response time and above average contrast and brightness ratings.

Additionally, this screen is manufactured using MVA technology, and we do rate the viewing angle of this monitor the second best in the round-up (second only to Sony). There was only a slight colour loss when viewing from greater than 150 degrees.

It has a 2cm thick bezel across the top and along the sides of the screen. This

monitor is one of only two in the round-up to require an external power supply (the other one is the View Sonic).

The brightness level of this monitor was superb in our testing. Likewise, its 800:1 contrast ratio made the screen a pleasure to use for viewing text, image and movies. While its quoted response time (21ms) is one of the slowest in the reviews, it did do well in our motion blur tests. In particular, white test on black and grey backgrounds remained white and did not emit a noticeable trail as it scrolled across the screen, while black test emitted a very short trail and turned slightly grey on white backgrounds.

This screen is rated as being able to display 16.7 million colours and it did not disappoint us in the DisplayMate. Banding was not noticeable in the colour blending tests nor in the 256-level colour intensity ramps, which displayed very smooth gradients. Its ability to display low levels of grey on a black background was very good, so dark movies or photographs will not be drowned out by the black.

An inexpensive price tag, coupled with great performance, makes this model the pick of the bunch.



PRICE \$499

URL www.protac.com.au

WARRANTY Protac supports this monitor with a three-year warranty. If the monitor is to be considered faulty, then it must have more than three bright pixels, more than five dark pixels or a combination of more than five bright and dark pixels.

**pc world
BEST BUYS**

VERDICT For \$499, this monitor is a definite Best Buy. It performed well in all our tests, particularly the colour and motion blur tests and it has one of the best viewable angles in the round-up. The only thing we don't like is the external power supply, which may cause unnecessary clutter.

Polyview outperforms 9 other LCD Monitors

1. Polyview V293	\$499
2. Acer AL1912M	\$749
3. Viewsonic VA912	\$499
4. NEC AccuSync LCD92V	\$659
5. Philips 1905	\$749
6. Mitsubishi DV191B	\$729
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10. LG Flatron L1950S	\$999

Elias Plastiras, PC World August 2005



➤ S17E

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1280 x 1024 resolution
Analogue input
400 cd/m² brightness
450:1 contrast ratio
8ms response time



➤ V372

\$399 RRP

17" LCD monitor
Built-in speakers
1280 x 1024 resolution
Analogue & digital input
400 cd/m² brightness
450:1 contrast ratio
8ms response time



➤ V293

\$499 RRP

19" LCD monitor
Built-in speakers
1280 x 1024 resolution
Analogue & digital input
330 cd/m² brightness
800:1 contrast ratio
21ms response time



➤ V396

\$599 RRP

19" LCD monitor
Built-in speakers
1280 x 1024 resolution
Analogue & digital input
320 cd/m² brightness
500:1 contrast ratio
8ms response time



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New Zealand:

Ph: (09) 570-7788
Fax: (09) 570-1286

Canon LiDE 500F

PRICE: \$209 DELIVERY: \$10

**LABS VERDICT**

Great performance, quality and looks. It only just misses out on the winners award.

Speed
Quality
Features
Value

**OVERALL**

We weren't expecting any design triumphs from these budget scanners, but Canon has clearly put a lot of thought into the aesthetics of the LiDE 500F. Built around the cheaper but more compact CIS/LED image capture system, it takes up virtually no space.

Dropping single photos or sheets of paper onto the platen works surprisingly well, and the lid is held shut by a pair of gentle magnets. The 500F is also userfully powered by its USB 2 connection, thus cutting down on cable clutter.

Beauty is only skin deep, so it's fortunate that the 500F's looks are backed up by equally good image quality. In fact, the 150ppi skin-tone test generated colours very close to the original print and appeared in Photoshop after just nine seconds. The 600ppi colour test was excellent too. Subtle

differences in shades were faithfully picked up and noise was almost absent. It was scanned in 20 seconds, placing it in the top three in the group.

The mono photo scan wasn't as impressive. The dynamic range was just slightly lower than that of the HP 4070, resulting in less detail in very dark and very light areas. Those wanting to convert documents into editable text will appreciate the inclusion of ScanSoft OmniPage 2 SE which does the job well. But at 150ppi, characters had jagged edges. This doesn't affect OCR, but means the copy button on the LiDE is less useful.

Unlike scanners with integrated transparency adaptors, Canon includes an external lightbox and a holder for strips of negatives. The drawbacks to this system are that you can only scan one frame at a time, while the HP and Epson can scan multiple. It's also a fiddly process to get a strip correctly positioned. The bonus is that the LiDE 500F features Canon's FARE (Film Automatic Retouching and Enhancement) Level 3. While not a professional solution, the negative scan was



► Canon only just falls short of the Labs winning Epson this month.

the best of the bunch and FARE made a very good job of restoring our red-tinted photo. Our heavily scratched black-and-white print was also well restored.

The Canon offers superb quality negative scanning and useful restoration technology. If you like the looks and are on a budget, the 500F is an excellent choice, but the Epson is faster, easier to use and offers similar quality.

SUPPLIER

Bargain 1300 388 688
www.bargain.net.au

HP Scanjet 4070 Photosmart

PRICE: \$279 DELIVERY: \$15-\$20

LABS VERDICT

Great quality for photos and negs, but slower and more frustrating to use than the Epson.

Speed
Quality
Features
Value

**OVERALL**

It's safe to say from the outset that we were hugely impressed by the HP's quality. A quick glance at the scores reveals why – the HP scored nine or more in five of our six tests. The 4070, like most of the scanners here, has an optical resolution of 2400ppi. The level of detail it can produce without introducing noise is impressive.

Scanning our stack box at 600ppi revealed almost no clipping, while subtle colour gradations were faithfully scanned. The mono image was superb. The 4070 showed off a good dynamic range and captured more detail than Epson's 2580.

The HP also has some tools for colour restoration. Although none are useful for mono or damaged photos, the 4070 successfully removed the red cast from our print.

There are some frustrating features though.

The transparency adaptor holds 12 reflective prints to allow for quick scanning, but it covers about 10mm of the sides of the prints. Not only does this mean images will be cropped, it also means that you won't be able to print 6 x 4in scans without stretching the image or leaving borders at the edges. The adaptor also has two holders for negatives. You can scan two frames from each strip before turning them over. This is inconvenient, but faster than scanning single frames as with the Canon.

Fortunately, the quality was good. A slight red colour cast prevented a perfect score, but HP's Image Zone scanning software lets you adjust the brightness of highlights, shadows and midtones. The software annoyingly forgets your settings each time you close it, but once you've found optimum settings you can explicitly save them.

Disappointingly, there's no auto-crop feature, so you have to manually select the scan area each time. There's no multiple image scan either.

Speed was nothing special – the HP was slightly slower, but still took only 20 seconds for a 7 x



► Good quality scans, although slower and not as user friendly as some.

5in 600ppi scan. A preview took ten seconds, but scanning a 35mm negative at the maximum optical resolution took two minutes, 28 seconds.

We liked the HP for its image quality. But considering the aggravating features such as the photo holder and scanning software, as well as the slower speed, the similarly priced Epson is better.

SUPPLIER

Ai Tech Computer 03 9523 1322
www.pc.net.au

Microtek ScanMaker 4850

PRICE: \$297 **DELIVERY:** \$10

LABS VERDICT

A wide range of bundled software isn't enough to offset its pitfalls.

Speed	★★★★★
Quality	★★★★★
Features	★★★★★
Value	★★★★★

OVERALL



The Microtek ScanMaker costs the best part of \$300 but it feels the cheapest. A quick glimpse at the Quality scores reveals all you need to know about the Microtek's capabilities. The skin-tone test revealed accurate colours but was very noisy. A 600ppi 7 x 5in scan revealed a limited dynamic range, as bright colours were clipped; bright areas of the image lacked some detail. Our mono beach image confirmed this – dark areas weren't detailed, and we were again disappointed by the amount of noise. On the plus side, the mono A4 text scan looked smooth and free of jagged edges.

The bundled ABBYY FineReader OCR software is OK for basic text pages, but others proved more adept at detecting images and tables. The rest of the software is good, though. Adobe

PhotoDeluxe Home Edition 4 supplies a good range of easy-to-understand tools, while Ulead DVD PictureShow 2 and Photo Explorer 8 SE Basic make browsing your library and distributing your images easy.

The ScanWizard 5 TWAIN interface is surprisingly well featured for the price. Although there's no histogram, you can adjust the highlights and shadows (but not the midtones) using an eyedropper. There's also an adjustable tone curve, and a brace of filters that includes sharpening and unsharp masking.

The automatic colour-restoration function worked reasonably well, although it didn't completely remove the red cast from our faded image. Another disappointment is the USB 1.1 interface. While this didn't have a huge impact on minor jobs such as generating a preview or scanning a 6 x 4in print at 150ppi (taking ten and 17 seconds respectively), the 7 x 5in print at 600ppi took one minute, 39 seconds. At this price, there are no negative or transparency capabilities. Plus, we tried the lightbox to scan



▲ An average performer in this month's roundup, better deals are elsewhere.

our test negative and were hugely disappointed by the quality. For demanding users, the Microtek doesn't have any fatal flaws. However, given that the Epson 2580 Photo costs just \$18 more and represents a quantum leap in terms of speed, quality and features, we simply can't recommend the ScanMaker 4850.

SUPPLIER

Gennix
www.gennix.net.au

Mustek Be@rPaw 4800TA

PRICE: \$175 **DELIVERY:** \$20

LABS VERDICT

A low-priced scanner with a plethora of features, sadly let down by poor image quality.

Speed	★★★★★
Quality	★★★★★
Features	★★★★★
Value	★★★★★

OVERALL



We didn't expect much refinement of negative-scanning abilities from a budget scanner but the Be@rPaw 4800TA surprised us. You can scan up to eight frames at a time, and the TWAIN driver will automatically select the frames, allowing you to quickly digitise dozens of negatives.

With five front-panel buttons and a high optical resolution of 2400ppi, the Be@rPaw scores highly for features and design. It's bolstered by a powerful TWAIN interface, which isn't particularly intuitive but offers a good range of tools. Adjustable gamma and tone curves make it easy to manually adjust preview images and the resultant scans, and there's a Smart Photo Refresh function for faded prints.

However, these promising features are let down by the poor quality of the results. All of our

negative scans appeared washed out with a blue cast. A few even showed vertical and horizontal banding. Cast can be corrected post-scan, but banding is permanent.

Scans from prints were equally unimpressive. The 7 x 5in 600ppi colour scan wasn't disastrous but, compared to the Canon, there was a loss of detail in dark areas, and noise was evident in shadow areas. Colours weren't as accurate, so subtle gradations were lost. Our skin-tone test, although not showing a significant loss of detail, had inaccurate colours, with tones appearing too warm.

Speed didn't help either. Scanning a 6 x 4in print at 150ppi took 16 seconds, while large jobs will really have you tapping your foot. A 7 x 5in print took 40 seconds to scan at 600ppi, while the monochrome image took 30 seconds. It all meant the Mustek was in the bottom three on test.

Bundled software wasn't too inspiring. ABBYY FineReader 4 Sprint lags well behind the current version 9, while Ulead PhotoExpress 4 SE isn't particularly powerful either. Even Microtek



▲ Some good features, sadly let down by poor imaging quality.

manages to include Adobe PhotoDeluxe. Ulead's DVD PictureShow 2 SE Basic lets you distribute your images, though.

Ultimately, the Be@rPaw can't compete against the competition this month. It's great to see so many features, but with such poor image quality there are few reasons to buy it.

SUPPLIER

Doico Australia (02) 9621 3322
www.doicoaustralia.com

Film scanners

If you mainly want to scan negatives or slide film, consider a dedicated film scanner.

A flatbed scanner is ideal for general-purpose use: document scanning and making copies of photos where quality isn't critical. Obviously a photo print developed by traditional chemical means, then scanned on a flatbed and printed on an inkjet will never give you the best quality for critical applications.

A film scanner, however, allows you to scan direct from the source of the print, be it negative or slide film. Not only do you cut out one step of generational image quality degradation, but you can potentially get better-quality results than existing prints: unlike a shop front photo-printing service, you can take a great deal of time to optimise the settings of the scanner to extract

maximum detail and the best colour balance for the final print. Only you know the particular way you want your prints to look, and a film scanner lets you take advantage of that fact.

The downside is that film scanners are considerably more expensive than flatbeds, partly down to their more sophisticated mechanisms and sensors and partly due to the fact that they're a relatively niche device. Economies of scale that have led flatbed scanner prices to plummet don't apply here.

But like all computing devices, they're nowhere near as expensive as they used to be, and if you have an extensive archive of old 35mm negatives or still regularly use a film camera, they're worth the outlay.



▲ A dedicated film scanner can extract far more detail from a negative than even the best flatbeds with film attachments. The scan above is a 100 percent crop from the Canon LIDE 500F; below the Nikon Super Coolscan 5000 ED.

	Epson F-3200	Minolta Scan Dual IV	Nikon Super Coolscan LS 5000 ED
Internet	www.epson.com	www.koniaminoita.com	www.nikon.com
Maximum resolution	3200ppi	3200ppi	4000ppi
Interface	USB, FireWire	USB	USB
Stated Density Range (Dmax)	3.8	4.8	4.8
35mm scan time at full resolution	35 seconds	1 minute, 8 seconds	44 seconds
Accepted film types	35mm; 120/220 medium format; 4 x 5in; 6 x 4in reflective	35mm; APS (with adaptor)	35mm; APS (with adaptor)
Dimensions (W x D x H) mm	210 x 230 x 94	164 x 325 x 99	96 x 315 x 172

Epson F-3200

PRICE: \$1263 DELIVERY: Depends on reseller

LABS VERDICT

A versatile scanner with scope for medium-format film, but image quality isn't on a par.

Quality



Features



Value



OVERALL



The F-3200 is an uncommon thing: a film scanner that's been built for convenience. Not only a dedicated film scanner, the Epson can also circumvent your PC and allow you to print directly to an inkjet printer, although the only models supported are the Epson Stylus Photo 2100 and R800.

You can also scan directly to a memory card; three slots accommodate CompactFlash/Microdrive, Memory Stick, SD/MMC and xD-Picture Cards. The direct printing function is supplemented by the ability to view ink levels, check for blocked nozzles and clean the heads if any nozzles are blocked.

With its unusual form factor, the F-3200 can accommodate a wider array of media than the Nikon or Minolta. It's very versatile in this respect: you can mount up to a dozen 35mm negatives or

eight 35mm slides. But there are also holders for 120 and 220 medium-format film (the holder will take up to 6 x 18cm), plus 4 x 5in film. You can even scan reflective media at up to 6 x 4in in size.

Plug in the F-3200 and by default, you can now start scanning using the unit in isolation, navigating with the integrated colour TFT screen. It's impossible to accurately preview the results on the tiny screen, though, let alone do any effective correction. Fortunately, the scanner does come with normal PC-based scan software that covers the standard range of functions, including histogram checking and exposure controls.

Unfortunately, for all its unusual features, the Epson can't live up to the standard of either the Nikon or Minolta when it comes to quality. Our 35mm test scans were noticeably soft compared to the others, with a consequent lack of detail. Noise was higher too, but on the positive side, dynamic range is very nearly as good as the Minolta, so the F-3200 is able to do your negatives justice as far as shadow detail and highlight capture are concerned.



▲ Not the best on show, but definitely not the worst out there.

It's quick too, taking just 35 seconds to complete a 35mm negative scan at its full 3,200ppi.

The F-3200 is an interesting concept and a relatively low-cost way to scan larger-format film. Standalone scanning is novel, but the obvious question is why on earth would you want to? For normal 35mm use, the more soberly designed Minolta and Nikon models give better quality, and the Scan Dual does so for considerably less money.

SUPPLIER

Epson Australia (02) 8899 3666
www.epson.com.au

Minolta Scan Dual IV

PRICE: \$520 (email sam@digitalcityonline.com.au) **DELIVERY:** Free

LABS VERDICT

A little chunky to use, but the Scan Dual delivers excellent scans for the money.



OVERALL



Coming in at the lowest price point of this trio, the fourth version of Minolta's Scan Dual range is a popular choice among amateur photographers. Operation of the machine itself is a little tedious. To start up a new session, you need to take out the film or slide adaptor and close the front door – annoying at first since the natural thing to do is insert the holder and then fire up the scanning software. The software itself is also less than intuitive – it took us a good five minutes to work it out.

Thankfully, all the features you need are there, including manual focus, tone curve adjustment and multisample scanning, plus software scratch removal and grain reduction. Scratch reduction is nowhere near as effective as the Nikon Coolscan's hardware-based system, though, and you can lose detail unless you take care.

Nikon Super Coolscan LS 5000 ED

PRICE: \$1830 (email sam@digitalcityonline.com.au) **DELIVERY:** Free

LABS VERDICT

Maintaining Nikon's reputation for quality, the Super Coolscan gives superb images.



OVERALL



Nikon pretty much dominates the high-end and semi-professional film scanner market, and the 5000 ED demonstrates why.

Unlike other film scanners in which your slides or negatives are mounted in a plastic holder and then fed in, the Nikon takes film unmounted, mechanically drawing it into the body. This avoids the potential for damaging the negative while trying to manipulate it into a holder, which is often a danger. Maximum optical resolution from the Coolscan is a heady 4000ppi; with a 35mm negative, this allows for images of up to 5670 x 3780 pixels. In digital camera terms, that's 21 megapixels – equivalent to the output of medium-format digital backs.

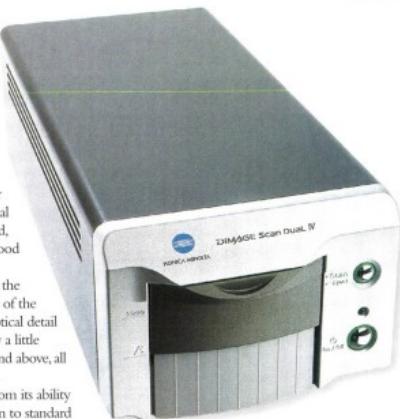
Results from the Coolscan are extremely impressive. The high dynamic range allows it to extract shadow detail you may never have noticed

Speed isn't the greatest either. The Scan Dual took one minute, eight seconds for our 35mm colour negative at 3200ppi, which compares unfavourably to under 50 seconds for the Nikon at higher resolution. Overlook the operational foibles and less-than-stunning speed, however, and scan quality is very good indeed for the money.

There's little to choose between the Scan Dual and the Nikon in terms of the ability to resolve shadow detail. Optical detail resolution of the Nikon is certainly a little higher, but with film of 200 ISO and above, all you'll really be pulling out is grain.

The Scan Dual's name comes from its ability to accept APS cartridges in addition to standard 35mm film and slides. Annoyingly, however, the APS cartridge holder isn't supplied. Remember also that with its smaller negative size, the quality of APS film is inherently poorer in comparison to 35mm. It means you can't expect the same level of quality. It's convenient, though – the APS adaptor sucks in the cartridge and winds the film back and forth internally.

Minolta has clearly built the Scan Dual to a price, but it's kept the emphasis where it should be: on final scan quality. If you're not going to



▲ This unit proves that slow and steady can in fact win the race.

be scanning very high-resolution emulsions or scratched negatives (where Digital ICE would come to the fore) and can put up with its faults, it delivers great results for the money.

SUPPLIER

Digital City (02) 2921 05616
www.digitalcityonline.com.au



▲ This scanner offers quality images, at a price.

SUPPLIER

Digital City (02) 2921 05616
www.digitalcityonline.com.au

How we test

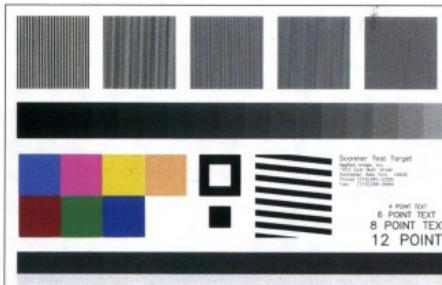
Our scan tests are a mix of subjective and objective benchmarks. Read on to find out how we tested.

Testing flatbed scanners is similar in many respects to testing digital cameras: the end result is virtually all that matters. So, while we tested scanners for speed, features, software and build quality, these accounted for less than a third of the final value for Money score.

We assessed image quality with LaCie's top-of-the-range 321 TFT. This calibrated, professional 21.3in TFT allowed us to directly compare the printed image with the scanned result, with the knowledge that the colours we saw onscreen were those that had been scanned. To ensure no bias could creep into the subjective Quality scores, scans were judged independently by two members of the Labs team.

Not all tests are subjective, though. We also scientifically calculated the signal-to-noise (SNR) ratio by scanning a professional target from Applied Images. We used our standard Labs test rig for the tests, with 1GB of Crucial PC-3200 RAM and a Western Digital Raptor hard disk for dealing with the large file sizes. We used Windows XP Professional and Adobe Photoshop 7 for viewing and manipulating our scans.

▼ A professional scanner target gives objective results.



REAL-WORLD TESTS

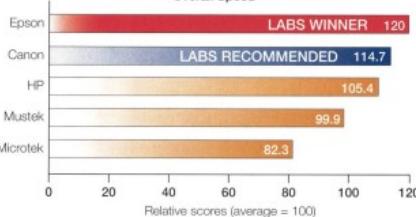
Our first test was a 150ppi scan of three models. This 6 x 4in print of varying skin tones was representative of the majority of work these scanners will do in the real world. We also scanned a 7 x 5in print of a snack box. This print is very high resolution and is scanned at 600ppi – the maximum practical resolution for most images. We looked for colour accuracy, as well as checking detail levels and sharpness; for example, ensuring that the light reflected from the tomatoes is sharp and bright.

We also scanned a monochrome image of a beach at 600ppi. This tested a scanner's greyscale capabilities, as well as how it handled areas of extreme dark and extreme brightness in the same image. Points were docked for losing detail in these areas, indicating a limited dynamic range.

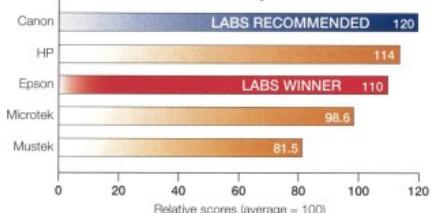
Most of the scanners this month can handle transmissive (for example, film) media. Where these capabilities are present, we scanned a 35mm negative of a busy street scene. We looked for accurate colours – an image that's too pale is indicative of a weak light source. We checked for good skin tones and shadow detail.



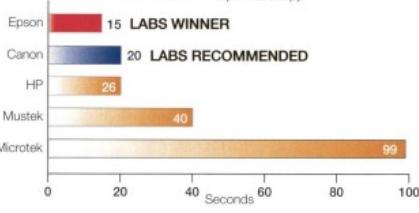
Overall Speed



Overall Quality



Scan time for 7 x 5 print at 600ppi



We scanned an A4 text document to assess both the scanner's ability with black text and the quality of the bundled OCR software. Here, we're looking for sharp characters with no jagged edges and a plain white background.

MEASURING SPEED

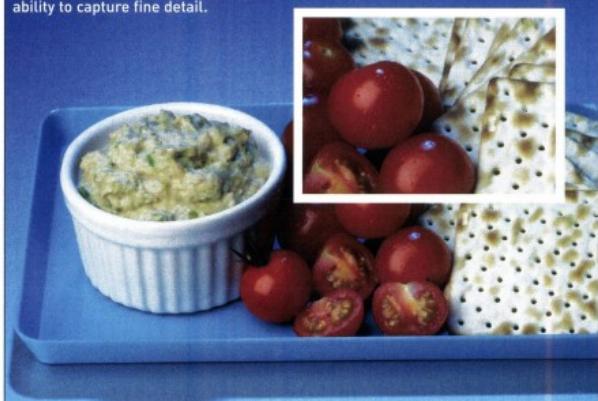
We timed these tests from the moment the Scan button was clicked in the TWAIN software to the time the image fully appeared in Photoshop. All the scanner lamps are warmed up before timing – a cold lamp can take up to 30 seconds to warm up for the first scan.

SCIENTIFIC TESTS

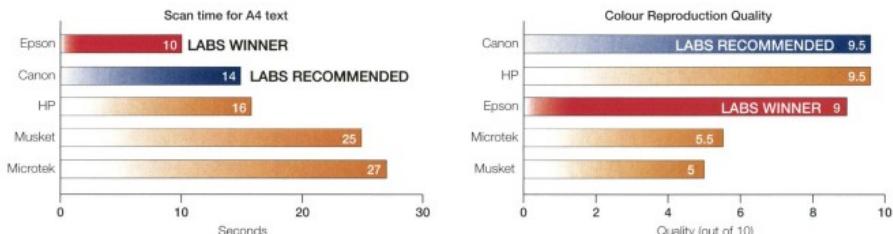
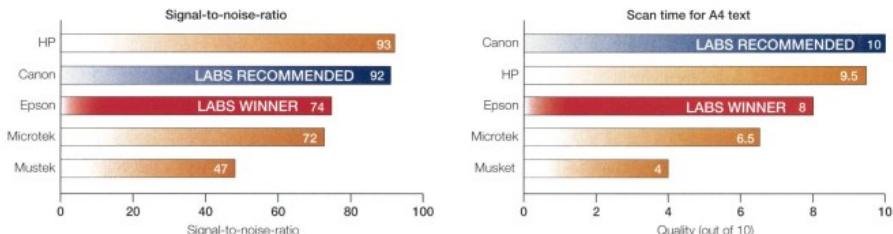
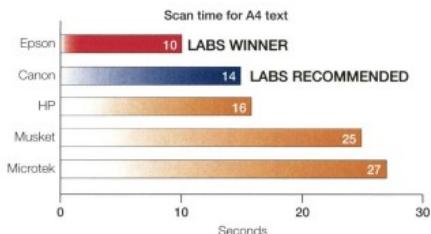
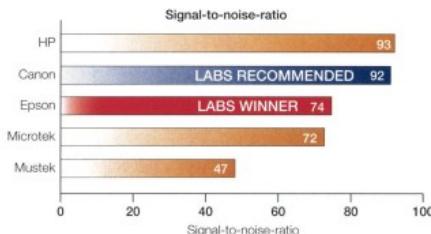
We tested the SNR of each scanner using an Applied Images scanner target. We scanned two identical areas of the greyscale bar in the middle of the image, subtract one from the other and apply a statistical calculation to arrive at an SNR figure.

We derived the SNR by taking the medians of the darkest and lightest patches and then dividing each one by the standard deviation of the same patch in the subtracted image. Again, we used the Histogram tool in Photoshop to obtain these figures. A higher number indicates cleaner images, since SNR is essentially a measure of how noisy you can expect your final images to be.

A very high-resolution print tests ability to capture fine detail.



'While we tested scanners for speed, features, software and build quality, these accounted for less than a third of the final Value for Money score.'



LABS | SCANNER ROUNDUP

							
Overall	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Manufacturer's specific order code	F91007	J142A	L920A	4850	4800TA		
Price (inc GST)	\$209	\$279	\$279	\$297	\$175		
Delivery (inc GST)	\$10	\$15-\$20	\$15-\$20	\$10	\$20		
Supplier's website	www.bargain.net.au	www.pc.net.au	www.pc.net.au	www.genrix.net.au	www.dicoausustralia.com		
Manufacturer's website	www.canon.com.au	www.epson.com.au	www.hp.com.au	www.microtek.com	www.mustek.com		
Basic warranty	1yr RTB	1yr RTB	1yr RTB	1yr RTB	1yr RTB		
PHYSICAL CHARACTERISTICS							
Dimensions W x D x H (mm)	285 x 400 x 35	275 x 425 x 80	290 x 475 x 80	295 x 490 x 60	265 x 440 x 75		
Power source	USB powered	Power adaptor	Power adaptor	Power adaptor	Power adaptor		
Interface	USB 2	USB 2	USB 2	USB 1.1	USB 2		
Cables supplied	USB cable	USB cable; power adaptor	USB cable; power adaptor	USB cable; power adaptor	USB cable; power adaptor		
Front buttons	Scan; copy; scan to email; scan to PDF Yes	Scan; copy; scan to email	Scan; copy; scan to OCR; negative scan Yes	Scan; copy; scan to email; scan to DCR; scan to web Yes	Scan; copy; scan to email; scan to fax; panel Yes		
Wide hinge for books	Yes						
OPTICS							
Maximum scanning area W x D (mm)	210 x 300	225 x 300	220 x 300	220 x 300	223 x 300		
Light source	LED	Cold cathode	Cold cathode	Cold cathode	Cold cathode		
Sensor type	CIS	CCD	CCD	CCD	CCD		
Transparency adaptor	35mm; six frames	Automatic negative feeder; six frames; 35mm slide; one frame	35mm; four frames; 35mm slide; four frames	No	35mm; eight frames; 35mm slide; six frames		
RESOLUTION & COLOUR DEPTH							
Optical resolution (ppi)	2400 x 4800	2400 x 4800	2400 x 2400	2400 x 4800	2400 x 4800		
Maximum interpolated resolution (ppi)	19,200	12,800	999,999	65,535	19,200		
Input greyscale bit-depth	16-bit	16-bit	8-bit	16-bit	16-bit		
Input colour bit-depth	48-bit	48-bit	48-bit	48-bit	48-bit		
DRIVERS INCLUDED							
Windows XP	Yes	Yes	Yes	Yes	Yes		
Windows 98 SE/ME	Yes	Yes	Yes	Yes	Yes		
Windows 2000	Yes	Yes	Yes	Yes	Yes		
TWAIN/WIA compatible	Yes	Yes	Yes	Yes	Yes		
Other	Mac OS X 10.2.7+	Mac OS X 10.2.7+	Mac OS X 10.1.5+	Mac OS 9+	No		
DRIVER OPTIONS							
Fully automatic mode	Yes	Yes	No	No	No		
Original document presets	Yes	Yes	No	No	No		
Output device presets	Yes	No	No	No	No		
Multiple photo scanning	Yes	Yes	No	Yes	Yes		
Descreen	Yes	Yes	Yes	Yes	Yes		
Scale	Yes	Yes	Yes	Yes	Yes		
Autocrop	Yes	Yes	No	No	No		
Manual colour adjustment	Yes	Yes	Yes	Yes	Yes		
Automatic colour correction	No	Yes	Yes	No	No		
Unsharp mask	Yes	Yes	Yes	Yes	Yes		
Brightness	Yes	Yes	Yes	Yes	Yes		
Contrast	Yes	Yes	Yes	Yes	Yes		
Gamma correction	No	Yes	No	Yes	Yes		
Tone map	Yes	Yes	No	Yes	No		
Histogram	Yes	Yes	No	No	No		
Highlight	No	Yes	Yes	No	No		
Shadow	No	Yes	Yes	No	No		
Eyedropper for highlight/shadow	No	Yes	No	Yes	No		
Sharpen/blur/soften	No/No/No	Yes/No/No	No/No/Yes	Yes/Yes/No	Yes/Yes/No		
Photo enhancement	Fading correction; grain correction; remove dust and scratches	Fading correction; remove dust	Fading correction	Colour restoration	Fading correction		
Others	No	Auto rotate; auto exposure	Auto exposure; invert; auto straighten		Saturation	Invert; emboss; flip; JPEG2000	
SOFTWARE SUPPLIED							
Image editing	ArcSoft PhotoStudio 5.5	ArcSoft PhotoImpression 5	HP Image Zone 4		Adobe PhotoDeluxe Home Edition 4; Adobe Photoshop Album 1 Starter Edition	Ulead Photo Express 4 SE	
OCR	ScanSoft OmniPage SE 2	ABYY FineReader 5 Sprint	IR.I.S Readiris 9.05 Pro		ABYY FineReader 5 Sprint	ABYY FineReader 4 Sprint	
Other	CanonScan Toolbox 4.9	Epson Scan to Web; Epson Smart Panel; Epson Copy Utility; NewSoft Presto! BiCard 4	HP Director		Ulead DVD PictureShow 2; Ulead Photo Explorer 8 SE Basic	DVD PictureShow 8 SE Basic; eLife Pal; Sound Em	

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www.safeoffsite.com.au

Wireless routers

Whether you're aiming to set up your first wireless network or want to upgrade an existing one, one of these nine routers will be the ideal choice.

Costing as little as \$160, and sporting an ADSL modem and hardware firewall, there's never been a better time to install a wireless router into your home or office. As well as allowing an Internet connection to be shared between several PCs or notebooks without needing one system to remain permanently on, a router can prevent hackers from stealing bandwidth and personal information.

We've also considered those wanting to replace their ISP-supplied modem. Some ISPs tie your account to the hardware MAC address of the modem, so your router needs to be able to 'clone' this address for you to be able to continue using the account.

There are plenty of tempting reasons to upgrade existing routers too. Take the DrayTek Vigor2600VG. This allows you to connect a regular phone and make free calls, all without needing a PC to be switched on. And if you've discovered your existing router doesn't offer quite enough speed or range, we also have an alluring line-up of MIMO routers. Based on Multiple-Input Multiple-Output technology, they promise bandwidth of 108Mb/s and ten times the range of standard 802.11g routers.

In all, we've put nine routers to the test. There's a surprising amount of

variety on offer, with the most expensive costing \$309 – almost two times that of the cheapest router on test. One factor they share, though, is great security. Quite apart from preventing other people snooping into your network, many offer the ability to filter websites from users by URL, keyword and even file type.

If you aren't familiar with all the jargon, make your first stop How we test on page 98 – this answers the most important questions facing any potential buyer. We also provide a full breakdown of each router's performance here.

But if you just want to find out which router is right for you, turn straight to the reviews, starting on page 92.

LABS EDITOR: Nick Ross

CONTRIBUTOR: Dave Stevenson



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Belkin Wireless Pre-N

PRICE: \$262 DELIVERY: \$10

LABS VERDICT

The highest speed over long range, the Belkin doesn't require extra outlay on signal boosters.

Performance



Features



Value



OVERALL

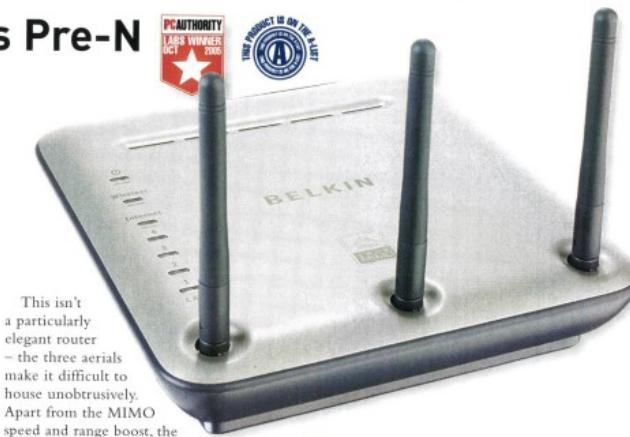


Four of the wireless routers this month come with MIMO (Multiple-Input Multiple-Output) technology, a system that transmits the same stream of data twice over one channel to increase signal strength and coverage. And the potential of MIMO is proved by the long-distance results of the Belkin Pre-N router.

Our long-range test saw a data rate – with WPA encryption – of 9.4Mb/s. This is faster than many other routers' short-range speed without encryption.

Our 100MB selection of files transferred under a minute-and-a-half, making the Belkin a great choice for larger offices or homes with multiple users, where long-range performance is critical. Close-range throughput of 16.8Mb/s still lags behind the Netgear's 18.6Mb/s, though.

As with most of the proprietary transfer-speed technology (MIMO will remain proprietary until 802.11n is ratified by the IEEE), Belkin claims that the Pre-N router works fastest with its own PC and PCI cards, so you won't be able to integrate it into an existing wireless network at full speed.



This isn't a particularly elegant router – the three aerials make it difficult to house unobtrusively. Apart from the MIMO speed and range boost, the Belkin offers the usual features.

The built-in firewall offers SPI (Stateful Packet Inspection) to protect you from DoS (Denial-of-Service) and Ping of Death attacks, but, unlike the Linksys Wireless-G SRX, there are no user-configurable filters, such as URL or keyword blocking.

WEP and WPA encryption are supported, although there is no 802.11D encryption – a loss only to large companies. You can filter permitted users by MAC address and, like all of the routers this month, you can allow unfettered access to a single PC using a DMZ (demilitarised zone).

Belkin also complies to the 802.11e QoS (Quality of Service) specification, meaning the quality of your VoIP calls are less likely to drop out if others start using the WLAN.

The Belkin is also user friendly. A step-by-step guide is included on the CD, which

▲ Belkin's Pre-N was the first MIMO unit we saw, and it's still the best.

will set up the router as you're walked through the settings on offer.

Updating the firmware is simple, as a button in the interface checks the Belkin website for new versions.

There's no denying that the Belkin Pre-N router is an expensive option, and the accompanying Pre-N PCI and PC Cards and PCI adaptors aren't cheap either, but there's also no arguing with the speed or range of the device. If you need your wireless network to cover a large area, the Belkin is the one to go for.

SUPPLIER

Gennix

www.gennix.net.au

FOCUS ON MIMO

Central to the nascent 802.11n specification is MIMO. Standing for Multiple-Input Multiple-Output, it splits one incoming data stream into multiple lower-rate streams, transmitting simultaneously via two or more aerials on the same channel. MIMO improves both range and transmission speed: relying on a phenomenon known as multipath – where signals arrive at different times because of reflections off nearby walls and so on – it effectively creates virtual radio channels along which more than one stream of data can be fed on the same physical frequency. Receiving the differing signals on multiple aerials,



the two data streams can be reconstructed. Current WLAN MIMO technology has a maximum theoretical speed of 108Mb/s – twice as fast as 802.11g and more than enough to cater for multiple users streaming multimedia files around a large house.

As our tests show, MIMO offers higher speeds over long range than

conventional WLAN, so you'll be able to connect from further away without spending extra on wireless bridges or repeaters.

Apart from the inevitably high cost of buying a new technology, the chief drawback of MIMO is that until it's ratified by the IEEE (Institute of Electrical and Electronic Engineers), the way in which it's implemented by manufacturers will be proprietary. This means there's no guarantee MIMO products from different manufacturers will work together at 108Mb/s; it's more likely that everything will slow to standard 802.11g speeds.

However, if you're building a multiple-user, long-distance WLAN from scratch, MIMO is an exciting technology offering demonstrably better speed and range.

► Linksys' Wireless-G SRX delivers good long-range results, thanks to MIMO.

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PX915PC Pro-G
"TOP BUY"
PC User
Aug.2005, Australia



7800GTX
"Power Award"
PC Power Play
Sep.2005, Australia



Recommended Hardware For Top Players



7800GTX



- NVIDIA® GeForce™ 7800GTX GPU
- Core Clock 430 MHz; Memory Clock 1200MHz
- 256 MB, 256-bit DDR III Memory
- Superscalar 24-pipe GPU Architecture
- PCI Express with Dual DVI / VIVO ports
- Supports CineFX™ 4.0 Intellisample™ 4.0, UltraShadow™ II, PureVideo
- Supports SLI technologies



7800GT



- NVIDIA® GeForce™ 7800GTX GPU
- Core Clock 400 MHz; Memory Clock 1000MHz
- 256 MB, 256-bit DDR III Memory
- Superscalar 20-pipe GPU Architecture
- PCI Express with Dual DVI / VIVO ports
- Supports CineFX™ 4.0 Intellisample™ 4.0, UltraShadow™ II, PureVideo
- Supports SLI technologies



PX915LI



- Supports Intel Pentium® 4 / Celeron® D Processor (Prescott)
- Socket 775 with FSB 533/800 MHz
- Supports Dual Channel DDR 400 Memory
- Supports 2 x PCI Express x 16 (Supports Dual Graphics 16X+4X)
- Built-in 6 Channel AC97 Audio
- ABS (Albatron BIOS security) (Optional)
- Built-in Realtek 10/100 Ethernet LAN
- Provides 4 SATA 150 channels



K8NF4X



- Supports Socket 939 AMD Athlon™ 64 Processors
- Socket 939 with FSB 1000 MHz
- Supports DDR 400+ Memory Capacity up to 2 GB
- Supports 1*PCI Express x 16, 3*PCI Express x 1, 2*PCI Slots
- Supports 6 channel AC'97 Audio
- Supports NVIDIA nForce4 4X 10/100 Mbps Ethernet LAN
- Supports 4 Serial ATA150 Channels, Serial ATA RAID 0,1,0+1
- Dual BIOS (Second BIOS by ABS Card) (Optional)
- Supports 8xUSB2.0/ SPDIF In-Out

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DrayTek Vigor2600VG

PRICE: \$299 DELIVERY: \$15

LABS VERDICT

Plenty of useful features, including an integrated ADSL modem and extensive VoIP support.

Performance



Features



Value

**OVERALL**

With many of the ADSL routers offering similar features, the DrayTek stands out a mile. A glance at the back of the unit suggests why: as well as an ADSL and four 10/100 Ethernet ports, there are two sockets for connecting phones to use with the built-in VoIP support. There's also a USB port for hooking up a printer, which can then be shared on the network. The VoIP feature is perhaps the most enticing. A tick in the 802.11e QoS checkbox means VoIP calls shouldn't drop in quality, while the two phone ports mean you can connect your handset and make Internet calls without needing a PC.

The Vigor2600VG offers some incredibly powerful filtering technology to control who can access what on the Internet. As well as URL and keyword filtering, permitted file types can also be filtered.

SMC ADSL2 Barricade g

PRICE: \$160 DELIVERY: \$20

LABS VERDICT

With a string of excellent features, providing you don't need a long range, it's a fine choice.

Performance



Features



Value

**OVERALL**

Among a selection of all-too-similar products, the SMC Barricade g stands out – and not just for its swish looks. As well as supporting ADSL2+ (the next generation of broadband, promising speeds of 24Mbps), it also has a Wireless Distribution System mode.

WDS allows the creation of a string of devices to expand a wireless network's range, allowing you to set up a single network in an obstruction-heavy environment. But perhaps best of all, the Barricade g does all this at a remarkable price, especially when you consider there's an ADSL modem lurking inside.

Despite the low price, SMC hasn't stinted on security features. The Barricade supports RADIUS and WPA as well as MAC filtering to keep your bandwidth and data safe. What's more, URL filtering can be specified per PC; you can

It's also possible to limit each user's bandwidth, which is useful if there's a large number of users and a low-speed ADSL connection. You can even opt to have the filter rules apply only at certain times of set days. Further protection is available with WPA filtering, making your network strong enough to withstand all but the most exhaustive brute-force attacks.

There are some great advanced features too. All the routers have VPN capabilities to an extent, but the DrayTek is one of only two that allows you to create, rather than simply accommodate, a VPN. Sixteen VPN tunnels make it a cheap way to expand your LAN across several sites. There's also a DMZ function to expose a PC – for instance, a web server – to the Internet.

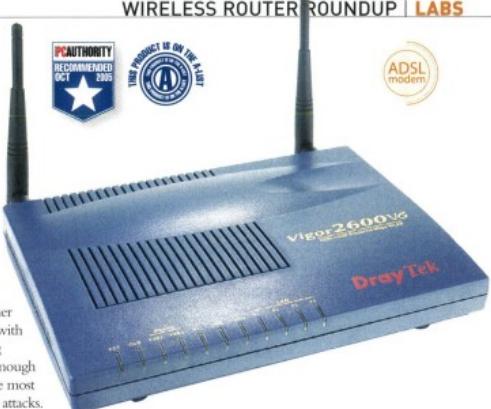
The DrayTek was quick in our benchmarks too. With no encryption, we were able to transfer 100MB of files in just one minute, and this rose by only three seconds with WPA. Even at medium range, the connection remained strong and took

even specify which times of the day to apply the rules. The only possible downside is that you can't specify keywords or file types to exclude.

The SMC proved speedy in our short-range tests, transferring 100MB of files in just over a minute with WPA encryption enabled. Without WPA, it was again near the top of the pile in our medium-range tests, but switching on encryption added 44 seconds – a drop of 5Mbps.

But its real problems only surfaced when we moved to our most demanding test. Moving into the garden saw the SMC unable to complete the file transfer in the time we allowed – we deemed it suitable for basic web browsing only from extended distances. It's this alone that prevents the Barricade g from picking up an award this month.

Don't cross the Barricade off your shortlist yet, though, as its easy setup routines are a joy. The ease is courtesy of a Quickstart wizard, accessed through the Barricade's built-in web interface. You'll have to manually select the channel to



just one minute, five seconds to transfer the files. There's no pre-N hardware, though, so our long-range test saw speed drop right off. Taking eight minutes, 22 seconds with WPA means it's only feasible to transfer small files over long distances.

The Vigor2600VG is undeniably the best-featured router in the Labs. If you need advanced features and filtering it's a superb choice.

SUPPLIER

I-Tech 1800 833 883

www.i-tech.com.au

operate on though, which involves a bit of trial and error.

With its great range of filtering features, the Barricade g is ideal for small workgroups, and particularly homes looking to share an Internet connection. It doesn't have the Voice over IP features of DrayTek's excellent Vigor2600VG, but with a price this low it makes a compelling option if you're on a limited budget and you want the convenience of an integrated ADSL modem.

SUPPLIER

ScorpTec 1300 726 770

www.scorptec.com.au

ASUS WL-500g Deluxe

PRICE: \$186 DELIVERY: \$13

LABS VERDICT

A router packed with features, but with disappointing performance.

Performance



Features



Value



OVERALL



Some of the routers on test are impossible to separate on features, so it's refreshing to see that ASUS has gone to some lengths to cram more than usual into the WL-500g Deluxe.

Along with the four 10/100 wired Ethernet ports and RJ-45 WAN connector are two USB ports. To these, you can attach a long list of printers,

webcams and even external hard disks, making the WL-500g Deluxe a superb choice for those looking to move mass storage and printing out of their living room without having to move the PC. There's also URL and IP filtering, as well as WDS (Wireless Distribution System), which allows you to wirelessly link access points to create a more expansive wireless network.

ASUS makes use of Afterburner technology to boost speeds, although the benefit of this weren't evident in our tests. But at least it completed them all.

If performance isn't critical, this is a fine buy that provides all you need to set up a basic wireless network with a webcam and potentially even network-attached storage.



SUPPLIER

Mini Digital 1300 659 046
www.minidigital.com.au

Belkin ADSL

PRICE: \$196 DELIVERY: \$14

LABS VERDICT

The Belkin offers good coverage and decent transfer speeds, but lacks features.

Performance



Features



Value



OVERALL



Many will appreciate the Belkin's sleek styling, as well as the fact that it has an integrated ADSL modem for a reasonably low price. Although it doesn't use MIMO like Belkin's Pre-N router, this ADSL router was impressively fast over long distance, achieving a transfer rate of 2.4Mb/s with WPA

encryption turned on for our 100MB of files.

This is good news, since most of the routers with ADSL modems were suitable for web browsing alone at long distance. However, the SMC Barricade g proved faster at close range, with 12.9Mb/s against Belkin's 8.5Mb/s.

Belkin's proprietary HSM (High-Speed Mode) is used to boost bandwidth to a claimed 12.5Mb/s, but this will only work with Belkin's own PC cards and USB adaptors – and none are supplied as part of the package.

You can't prevent users from accessing undesirable Internet content, as there's no URL filtering, and there are no VoIP features either.



But if you're in the market for an ADSL modem on a tight budget, and you need long-range performance, the Belkin is a solid choice.

SUPPLIER

Mini Digital 1300 659 046
www.minidigital.com.au

Buffalo AirStation WZR-G108-1

PRICE: \$309 DELIVERY: In store only

LABS VERDICT

With slower speeds than the other MIMO routers, the Buffalo looks overpriced.

Performance



Features



Value



OVERALL



The AirStation must work hard to justify its price, but starts well by offering MIMO technology and a promise of simple setup thanks to AOSS (AirStation One Touch Secure System). In theory, the latter sets up wireless connections at the touch of a button, although we found it only worked intermittently –

it's easier and quicker to change the settings manually.

We were expecting good performance, but felt disappointed. With WPA encryption, our close-range test took one minute, 45 seconds. The medium-range was three seconds faster – slower than most competitors.

But two minutes was all it took to transfer 100MB of WPA-protected files into the garden; though the Belkin and Linksys MIMO routers were faster still.

While MIMO and AOSS are interesting technologies, the Buffalo doesn't pull either off convincingly. Being too slow over short and long distances compared to the cheaper MIMO alternatives, Buffalo needs to lower its price to compete.



SUPPLIER

Harvey Norman
www.harveynorman.com.au

Linksys Wireless-G SRX

PRICE: \$253 DELIVERY: \$10

LABS VERDICT

It may sit at the expensive end of the scale, but a mix of pace and features make it a good choice.

Performance	★★★★★
Features	★★★★★
Value	★★★★★

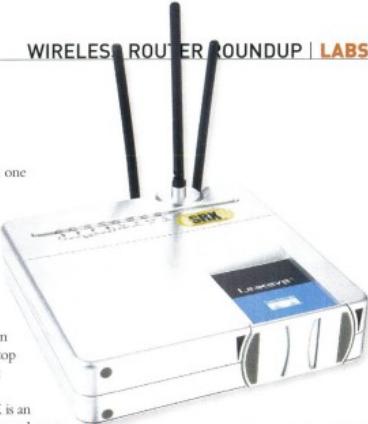
OVERALL

Bearing a passing resemblance to a landline, we were glad that Linksys' SRX router lived up to its MIMO promise – 100MB of data was transmitted in just one minute, 28 seconds (9.5Mb/s), making the SRX the second-fastest long-distance router. It was also impressively consistent in our medium- and short-range tests:

it allowed us to copy 100MB of data in one minute, ten seconds in each test.

VoIP users are catered for by the 802.11e QoS (Quality of Service) feature, which will ensure VoIP calls have priority if multiple users are connected to the SRX. In addition to MAC address filtering, you can set rules for URL and keyword filtering for individual PCs. You can also set when the rules apply, so you can completely stop Internet access for a certain PC for a set number of hours per day.

Overall, the Linksys Wireless-G SRX is an excellent unit, boasting plenty of features and great speed, even over long distances. But, it misses out on an award because the Belkin is faster over long range – the *raison d'être* of MIMO routers.

**SUPPLIER**

Gennix

www.gennix.net.au

Netgear WPN824 RangeMax

PRICE: \$165 DELIVERY: \$10

LABS VERDICT

Not a good choice to cover a large area, but quicker than average over shorter distances.

Performance	★★★★★
Features	★★★★★
Value	★★★★★

OVERALL

While the Netgear's pulsing blue LEDs might prove annoying at times, the RangeMax is otherwise one of the best-looking routers this month. The seven MIMO antennas are internal, giving a sleek, compact look. Unfortunately, the hidden antennas seemed to hamper performance. Netgear claims a 1000

percent coverage and speed increase over standard 11g; an optimistic claim, which the RangeMax didn't live up to.

Transferring 100MB in one minute, 12 seconds at close and medium range with WPA encryption is impressive. But, disappointingly, the RangeMax couldn't make any connection at all at long range – the other MIMO routers took two minutes or less.

The RangeMax ticks all the right boxes in terms of features though. You can control Internet access through URL and keyword filtering, though you can only exclude one PC at a time from the rules, although scheduling when you want them to apply offers some flexibility.

The Netgear might be cheap for a MIMO



router and even offer more features than some of its competitors, but the difficulty in establishing a connection at long range negates all of these benefits and makes it look expensive. If you want a good MIMO router you have to pay more for it.

SUPPLIER

Computer Alliance (07) 3421 3200

www.computeralliance.com.au

Sitecom WL-143

PRICE: \$180 DELIVERY: Depends on reseller

LABS VERDICT

A good range of features and a low price are let down by disappointing speed.

Performance	★★★★★
Features	★★★★★
Value	★★★★★

OVERALL

Sitecom claims the WL-143 will muster up to 140Mb/s, making it theoretically the fastest wireless device we've seen. It's said to achieve these speeds by using its 'Nitro' mode. When passing data between two clients, the router creates a direct link between the two stations, effectively creating a temporary ad-hoc network.

But with our client to router test scenario, performance was average. Although a 100MB transfer in one minute, 12 seconds at close range isn't bad, it pales in comparison with the Netgear. Medium-range performance dropped only slightly – it took one minute, 24 seconds. But we registered no connection in the long-range test.

Fortunately for Sitecom, the WL-143 offers a reasonable range of features to make up for the shortfall in performance. It can operate as a WDS station, so you can link it with other routers to expand coverage.

There's no keyword or URL filtering but a setup wizard simplifies configuration. But all these features are available with most other routers too. In spite of the low price, the disappointing performance prevents it taking an award.

**SUPPLIER**

Anywhere 1300 269 927

www.anywhere.com.au

How we test

A guide to the most important elements of a modern wireless router, how we test and what the results mean.

Buying a wireless router has never been more confusing. There are new technologies to understand, new acronyms to learn and a whole new set of questions you need to ask: will you use VoIP? Will you miss out on anything vital if you don't buy a MIMO router? What level of security does your network require? And at the most basic level, should you opt for an integrated ADSL modem?

If you'll be using VoIP it makes sense to choose a router with QoS (Quality of Service). This improves sound quality by guaranteeing priority to the VoIP application. Unique to the DrayTek among this Labs is another useful feature: two phone sockets, allowing you to use an existing 'normal' phone with technologies like SIP (Session Initiation Protocol).

We have mixed feelings over MIMO. There's no doubt that it can boost speeds tremendously, especially at longer distances, but at the moment there is a serious premium to pay and, quite apart from the premium of the router itself, compatible PC Cards and adaptors cost at least \$60 each. We examine the question of the speed people really need and the benefits of MIMO in two separate boxouts (How fast?, see right, and Focus on...MIMO, page 92).

Security is well handled by all of these routers. Without exception, they offer 64- and 128-bit WEP (Wired Equivalent Privacy) encryption, WPA (Wi-Fi Protected Access) and MAC address control, with the latter being the preferred choice for a business network. RADIUS (Remote Authentication Dial-In User Service) is also common to more serious routers, allowing companies to authenticate dial-in users before giving them access to the network.

The final question – whether to buy a router with or without an ADSL modem – often depends on your ISP. If it supplied a basic ADSL modem that only plugs into the USB port, forcing you to use your PC to 'dial' in, then we recommend you opt for an ADSL router due to the convenience (for instance, you don't need your

PC switched on to keep the connection to the ISP) and because you can take advantage of the hardware firewall built into the router. Otherwise, a standard router will do the job perfectly well. Also bear in mind that a basic ADSL modem like the D-LINK DSL-502T costs just \$70 from www.qcgo.com.au.

HOW WE TEST PERFORMANCE

To test our routers in as fair a scenario as possible, we headed out of our urban office and into an isolated house in the outer suburbs.

We set up a PC in an upstairs study at the front of the house. Each router was connected to it via a standard Ethernet cable. We assembled 100MB of test files onto the hard disk, consisting of a 50MB TIFF and 50MB of small files. We then carried out six transfer tests in three different locations.

Each test involved copying the files from the PC to an IBM ThinkPad T42. If the router was a standard 802.11g affair, we used the ThinkPad's integrated radio. But if proprietary speed enhancers like MIMO were on offer, we used the manufacturer's PC Card.

The first location (close range) was in the same room within 2m of the router. The second test saw the ThinkPad moved one floor down and one room across (to the side of the house), so the signal must pass through floors and interior walls.

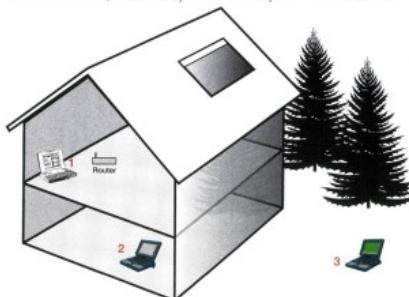
The third and final test was where we took the ThinkPad out into the garden at the back of the house. This saw the performance of many routers drop off dramatically. If after ten minutes of transfer time there was still 30 minutes to go, we declared that the router was suitable for basic web browsing only at this distance, not file transfer. A couple of routers were unable to connect at all, either with the ThinkPad's built-in radio or the recommended PC Card.

After all three tests were carried out twice – once with no encryption and then with WPA encryption – an overall performance score was derived by averaging the six times. The score at the bottom of each review denotes their relative speed.

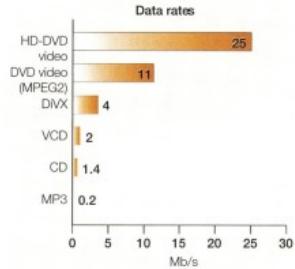
HOW FAST?

Some of the routers here make astronomical claims in terms of data rates. Like plenty of specifications, though, they should be taken with a pinch of salt. Even 802.11g's claimed 54Mb/s is wishful thinking – the fastest throughput we saw was 18.6Mb/s from the Netgear, and even that was in an ideal testing environment. Wireless bandwidth can drop off hugely when there's interference from other networks, microwaves or when the signal has to travel through obstacles such as walls and floors.

But how much bandwidth do you actually need? If you just want to share a 2Mb/s broadband connection, all the routers on test are quick enough at close or medium range. However, if you want to transfer large files or wirelessly stream video or audio, throughput becomes more critical. Video is naturally the most demanding, with MPEG2 DVD video being out of the question for most routers – its 11Mb/s peak doesn't leave much headroom, even at close range. DivX (or WMV) is a more practical choice, as, depending on the amount of compression, it can have an average data rate of 4Mb/s or lower. Streaming music is also a relatively lightweight job, with uncompressed CD audio requiring only 1.4Mb/s and MP3s rarely needing more than 0.2Mb/s. At close range, all of this month's routers are capable of streaming multiple compressed videos and MP3s with enough spare headroom to allow other users to browse the Net. But, when High Definition DVD and TV begins to emerge, its 25Mb/s required data rate will mean that current routers won't be man enough to handle streaming it wirelessly.



► We tested the routers in three different locations: at close range to the router [position 1, in the same room], at medium range [position 2, on the floor below] and at long range [position 3, outside].



FEATURES & DESIGN

Not so long ago, it was difficult to differentiate most 802.11g routers from one another. However, there are now some exciting features that can tempt you over raw performance alone. We calculated the Features score by awarding points to every aspect, from warranty duration and security through to VoIP features and webcam support.

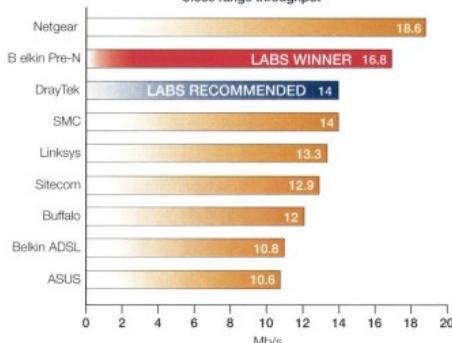
VALUE FOR MONEY

Value is as important a consideration as ever. We calculated the Value For Money rating by combining 50 percent Performance with 50 percent Features and multiplying by the price index. This is the price (including delivery) relative to the total prices of the other routers on test this month.

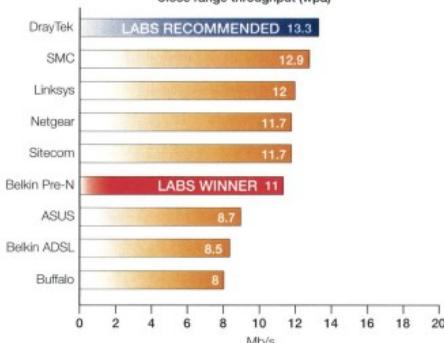
OVERALL

The Overall score is simply a straight out average of Performance, Features & Design, and Value for Money. The router with the highest Overall score was awarded the Labs Winner, with a Recommended award going to any product that excelled in one or more of our judging criteria.

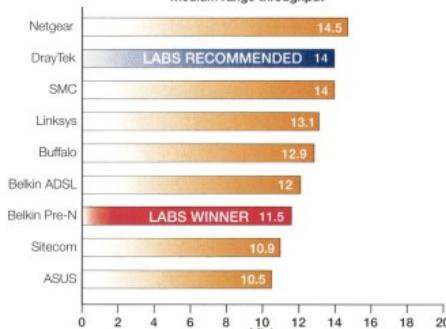
Close range throughput



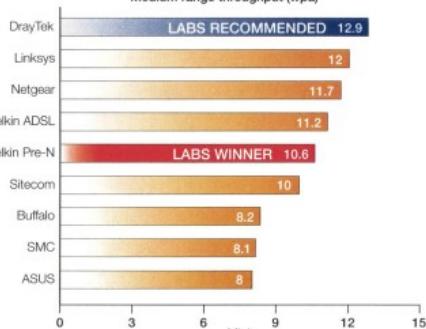
Close range throughput (wpa)



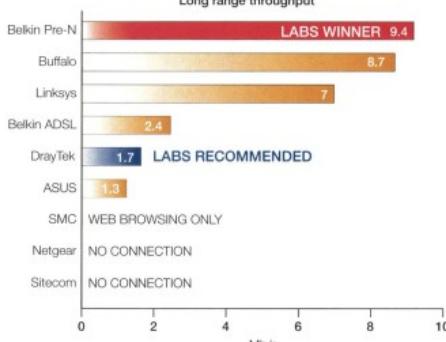
Medium range throughput



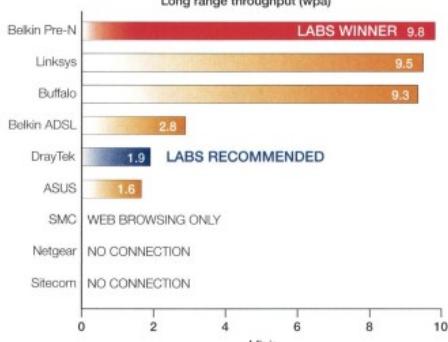
Medium range throughput (wpa)



Long range throughput



Long range throughput (wpa)



LABS | WIRELESS ROUTER ROUNDUP



	ASUS WL-500g Deluxe	Belkin ADSL	Belkin Wireless Pre-N	Buffalo AirStation WZR-G108-I
Overall score	★★★☆☆	★★★☆☆	★★★★☆	★★★★☆
Manufacturer's code	WL-500g Deluxe	F5D7032au	F5D8230au	WZR-G108-I
Price ¹ (inc GST)	\$166	\$196	\$262	\$309
Delivery ² (inc GST)	\$13	\$14	\$10	In store only
Supplier's website	www.minidigital.com.au	www.minidigital.com.au	www.genix.net.au	www.harveynorman.com.au
Manufacturer's website	www.asus.com	www.belkin.com.au	www.belkin.com.au	www.buffalo-asia.com
Basic warranty	1yr RTB	Lifetime RTB	Lifetime RTB	2yrs RTB
BASIC SPECIFICATIONS				
ADSL modem	N	Y	N	N
Broadband connection	Ethernet WAN; cable or ADSL modem	RJ-11 ADSL port	Ethernet WAN; cable or ADSL modem	Ethernet WAN; cable or ADSL modem
Wireless standards supported	802.11b/g; Afterburner high-speed mode	802.11b/g	802.11b/g; MIMO	802.11b/g; MIMO
Quoted maximum speed	125Mbps	125Mbps	108Mbps	108Mbps
Antennas (MIMO)	1 x removable external	2 x fixed external	3 x fixed external (MIMO)	3 x fixed external (MIMO)
Network sockets	4 x 10/100 Ethernet	4 x 10/100 Ethernet	4 x 10/100 Ethernet	4 x 10/100 Ethernet
USB ports	2	N	N	N
MAC address cloning	Y	N	Y	Y
Cables and accessories ³	1E	1E; 1T; 2F	1E	1E
Wireless bridge (IWDS)	Y	N	Y	N
Other features	UPnP; USB FTP server; USB print server; USB webcam support	UPnP	UPnP	UPnP
VoIP FEATURES				
Quality of service	N	N	Y	N
Phone sockets	N	N	N	N
SECURITY				
WEP (bits)	64/128	64/128	64/128	64/128
WPA	Y	Y	Y	Y
MAC access control	Y	Y	Y	Y
DMZ	Y	Y	Y	Y
VPN	Passthrough only	Passthrough only	Passthrough only	Passthrough only
Application filtering	N	N	N	Y
Port forwarding	Y	Y	Y	Y
Hide SSID	Y	Y	Y	Y
SPI firewall	Y	Y	Y	Y
Other security features	IP filtering; RADIUS; URL filtering	N	IP Filtering; 6 months' free parental control filters	IP filtering; email alert; intrusion detector; dynamic packet filtering
Management				
Software	Quickstart wizard	N	Easy install wizard	Base station setup
Hardware power switch	N	N	N	N
Router-specific client adaptors				
PC CARD				
Model	ASUS WL-100g	Belkin F5D7011au	Belkin F5D8011au	Buffalo WZR-G108-I
PC Card adaptor RRP (inc GST)	\$129	\$90	\$200	\$199
WLAN type	802.11b/g	802.11b/g	802.11b/g; MIMO	802.11b/g; MIMO
USB ADAPTOR				
Model	ASUS WL-167g	Belkin F5D7050au	N/A	N/A
USB adaptor RRP (inc GST)	\$129	\$100	N/A	N/A
WLAN type	802.11b/g	802.11b/g	N/A	N/A
PCI ADAPTOR				
Model	ASUS WL-138g	Belkin F5D7003au	Belkin F5D8003au	N/A
PCI adaptor RRP (inc GST)	\$49	\$90	Yet to be released to public	N/A
WLAN type	802.11b/g	802.11b/g	802.11b/g; MIMO	N/A

¹ Prices were correct at time of going to press. ² Delivery may be more for remote locations. ³ Key: E = Ethernet cable; T = telephone cable; F = ADSL filter

					
★★★★★ 5/5*	DrayTek Vigor2800VG	★★★★★ 5/5*	Linksys Wireless-G SRX	★★★★★ 5/5*	Netgear WPN824 RangeMax
\$269	Y	\$253	WRT54GX	\$165	WPN824
\$15	\$10	\$10		\$180	WL-143
www.i-tech.com.au		www.genix.net.au		Depends on reseller	SMC9704WBRA
www.draytek.com.au		www.linksys.com		www.anywhere.com.au	www.scorpnet.com.au
3yrs RTB	3yrs RTB		2yrs RTB	10yrs RTB	www.sitecom.com
					www.smc.com
					5yrs RTB (with registration)
Y	N	N	N	N	Y
RJ-11 ADSL port	Ethernet WAN; cable or ADSL modem	Ethernet WAN; cable or ADSL modem	Ethernet WAN; cable or ADSL modem	Ethernet WAN; cable or ADSL modem	RJ-11 ADSL port
802.11b/g	802.11b/g; MIMO	802.11b/g; MIMO	802.11b/g; MIMO	802.11b/g; Nitro high-speed mode	802.11b/g
54Mbps	108Mbps	108Mbps	108Mbps	142Mbps	54Mbps
2 x removable external	3 x fixed external [MIMO]	7 x fixed internal [MIMO]		Fixed external	2 x fixed external
4 x 10/100 Ethernet	4 x 10/100 Ethernet	4 x 10/100 Ethernet	4 x 10/100 Ethernet	4 x 10/100 Ethernet	4 x 10/100 Ethernet
1	N	N	N	Y	N
N	Y	Y	Y	Y	Y
1E, 1T	1E	1E	1E	1E	1E, 1T, 2F
Y	N	Y	Y	Y	Y
UPnP; bandwidth throttling; USB print server; VLAN	UPnP	UPnP	UPnP	UPnP	UPnP
Y	Y	N	N	N	N
2	N	N	N	N	N
64/128	64/128	64/128	64/128	64/128	64/128
4 [and WPA2]	Y	Y	Y	Y	Y
Y	Y	Y	Y	Y	Y
Y	Y	Y	Y	Y	Y
4 [to tunnels]	Passthrough only	4 [to tunnels]	Passthrough only	Passthrough only	Passthrough only
Y	N	N	N	N	N
Y	Y	Y	Y	Y	Y
Y	Y	Y	N	N	Y
Y	Y	Y	Y	Y	Y
IP filtering; RADIUS; URL and keyword filtering; file-type filtering; VLAN; Active-X/Java blocking	RADIUS; URL filtering; keyword filtering	URL filtering; keyword filtering; service filtering	IP filtering; RADIUS	IP filtering; RADIUS; URL filtering; keyword blocking	IP filtering; RADIUS; URL filtering; keyword blocking
Quickstart wizard; firmware upgrade tool	Setup wizard	Setup wizard	Setup wizard	Setup wizard	Setup wizard
Y	N	N	N	N	Y
DrayTek Vigor560 Wireless LAN Adapter	Linksys WPC54GX Wireless-G Notebook Adaptor with SRX	Netgear WPN011	Sitecom WL-140	SMC2835 EU EZ Connect g Wireless Cardbus Adapter	
\$59	\$219	\$129	\$85	\$49	
802.11b/g	802.11b/g; MIMO	802.11b/g; MIMO	802.11g; Nitro XM	802.11b/g	
DrayTek Vigor550 Wireless LAN Adapter	N/A	Netgear WPN111	Sitecom WL-142	SMC2802W-G EU EZ Connect g	
\$99	N/A	\$149	\$100	\$59	
802.11b/g	N/A	802.11b/g; MIMO	802.11g; Nitro XM	802.11b/g	
N/A	N/A	Netgear WPN311	Sitecom WL-141	SMC2802W-G EU EZ Connect g Wireless PCI Card	
N/A	N/A	\$129	\$85	\$49	
N/A	N/A	802.11b/g; MIMO	802.11g; Nitro XM	802.11b/g	

this wireless world

Nathan Taylor explores the world of wireless technology, from WANs, LANs and PANs – what we've got, and what's to come.



The technology topic *du jour* of the naughties, wireless technology is everywhere. For just about any application or service involving data transport, there's a wireless solution. It's possible that eventually, the only wires we'll have in our home will be the power cables, connected to all the battery rechargers.

We still have a long way to go yet, however. The fundamental problem with wireless is that it's inconsistent and unreliable, especially for high-speed transport. It's still a poor choice for

streaming services, for instance, since it often tends to be "bursty", and can also tend to have latency issues.

Still, new technologies are on the way which, it's hoped, will deliver on the promise of the completely wireless world, so that eventually the unfathomable tangle of wires at the back of your PC and home stereo systems can join your 8-track, Commodore 64 and paisley-patterned flares in that special spot in the garage reserved just for the things you realistically know you'll never use again, but keep around 'just in case'. ▶

THE WIRELESS WAN

Remember when 3G was at the peak of its hype cycle? There was much talk of video conferencing on your mobile phone, accessing the Internet and reading the Australian online while on the train in the morning and firing off emails while sitting on a beach somewhere. How did that pan out for everyone?

But new wireless broadband services are making the dream of Internet anywhere and everywhere a reality. Today, you can get ADSL-like speeds to your home or on the road without needing a copper or coaxial line. With rough pricing parity to ADSL services, wireless broadband has taken off in Australia, albeit only for those living in high density areas (the low-hanging fruit of telecommunications).

With the future introduction of WiMax, it's expected that wireless will also be able to keep speeds competitive with those of ADSL (which is now available – in limited areas – at speeds of up to 12Mb/s).

WHAT WE HAVE NOW

It began with wireless hotspots – places where people with a Wi-Fi card and an account with a service provider could go and access the Internet at high speeds. Wi-Fi hotspots are still around – Telstra, for instance, has hotspots in Starbucks, McDonalds and Qantas lounges, where, for \$5 for the first 15 minutes and 20c per minute after that, you can access the Internet through your Wi-Fi card.

Wireless broadband has largely moved on, however, to services that act like supercells – wireless networks that cover entire cities.

Right now in Australia, we have three major providers of such wireless broadband services: iBurst, Unwired and BigAir. Throw in wireless



▲ BigAir's line-of-sight wireless broadband beams across Sydney.

hotspots from the likes of Telstra and Optus, along with (allegedly) broadband mobile services, and you already have a panoply of wireless broadband options to choose from. Unfortunately, all these services use different technologies, so switching between service providers is something of a forklift change.

Unwired, iBurst and BigAir all offer their network services to resellers, who are often inclined to brand them portable, mobile and fixed wireless Internet respectively. This is an artefact of the technology each uses: Unwired you can take from place to place with you, but not use while in transit; iBurst you can use while moving; BigAir you can't move at all – it works only on a fixed location.

Unwired, which is only available in Sydney at this time, uses technology from a company called Navini Networks to deliver services up to (at the moment) 1Mb/s downstream/256Kb/s upstream. The 'rabbit' – Unwired's modem device – can be carried around with you. As long as you're in range of an Unwired base station (which cover more than 90 percent of the population of Sydney), you have Internet access. The rabbit can't handle sending or receiving data while on the move, however, so you must be stationary to get Internet access.

iBurst uses a rather different technology, from a company called ArrayComm. The technology, called IntelliCell, can also presently deliver up to 1Mb/s downstream/345Kb/s upstream to users. IntelliCell uses what ArrayComm calls adaptive antennas, allowing users to receive data while moving at up to 70km/h and more. The modem comes in both full-size external and PC Card format, meaning that you can use iBurst, for instance, in your notebook while on the train in the morning. iBurst currently has coverage in a number of Australia's major cities, including Sydney, Wollongong, Newcastle, the Central Coast of NSW, Brisbane, the Gold Coast, Melbourne and Canberra.

The third major provider, BigAir, uses a modified form of Wi-Fi to deliver wireless broadband services up to 10Mb/s symmetric (and even 100Mb/s in some cases). The customer gets a high-gain directional antenna, points it directly at the nearest BigAir base station and Internet access ensues. You can't exactly carry a high-gain directional antenna around with you, however, and it's not always easy to know the exact direction in which you'll find a BigAir base station, so BigAir is a form of fixed wireless broadband. It's only available in Sydney right now, and only in areas in which the user has a direct line-of-sight to a BigAir antenna.

WIRELESS BROADBAND AND VOIP

It would be easy to think of wireless broadband combined with VoIP as a devastating one-two punch to GSM and other mobile voice technology. Fortunately for the mobile phone companies, that's not the case right now.

The key problem with existing broadband technologies (including long-range Wi-Fi) is latency and consistency.

To have usable VoIP, the latency (the amount of time it takes for a packet of data to travel from its source to its destination) has to be consistently less than 250ms. A phone conversation in which there's more than a quarter of a second delay between when a word is spoken and when it is heard at the other end can be downright painful.

Early tests on the iBurst and Unwired networks demonstrated latencies that were infrequently in excess of 250ms to US sites, and over 70ms to many Australian sites. Those kinds of latencies cannot ensure decent conversation quality over VoIP, nor do they deliver great operation in other latency-

sensitive applications, such as online games and video and audio streaming.

Another problem with many wireless networks is bandwidth contention, which works in most cases on a first come, first serve basis. As a result, nodes closer to access points will often get a bigger share of the bandwidth pie than nodes further away, since they keep jumping in and preventing the more distant nodes from having their turn at data access.

Because of the Ethernet-like line contention in most existing wireless LANs and some WANs, data streaming can become quite inconsistent. You get bursts of data, then nothing, then another burst and so on. For media services like VoIP and video streaming, service interruptions are unacceptable, even for a fraction of a second.

WiMax may change the picture here as well. Instead of network users having to compete for every millisecond of access time, WiMax access points divvy out time slices to nodes, providing consistent throughput.

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WAN wars: WiMax rules on range and speed

Standard	Range	Max throughput (theoretical)
WiMax (802.16)	15-50km	70Mb/s
Unwired (proprietary)	10km	1Mb/s
iBurst	13km	1Mb/s
3G (Wideband CDMA)	1-30km	384Kb/s
BigAir (802.11b variant, migrating to WiMAX)	Unknown (likely 100m)	10Mb/s
EDGE (extension of 2.5G)	1-30km	384Kb/s

These three aren't the only wireless broadband options available, although they're the most practical for those of us who don't have a chequebook the size of Kerry Packer's. If you do have unlimited money at your disposal, however, you can try looking into EDGE GPRS or 3G mobile broadband services, which can deliver high-speed Internet access to mobile phones (see sidebar).

WHAT WE WILL HAVE

The future for wireless broadband can be summed up in a single word: WiMax, a.k.a. IEEE 802.16. We're still deep in the hype phase for WiMax, and results from real-world tests are thin on the ground, but the core specifications for the protocol are impressive.

'With the future introduction of WiMax, it's expected that wireless will also be able to keep speeds competitive with those of ADSL.'

WiMax can be thought of in similar terms to Wi-Fi, although while the range of Wi-Fi is measured in metres, the range of WiMax is measured in kilometres. With the massive range of WiMax, service providers will be able to blanket entire metropolitan areas with only a few cell towers.

WiMAX isn't the only proposal on the table for wireless broadband – Europe's Hiperman (High Performance Radio Metropolitan Area Network) has also been in development for some time, but is not seen as a serious contender.



It's feasible, though at this stage unlikely, that WiMax will also have corporate applications, replacing Wi-Fi in enterprises. The added range of WiMax would make it possible that an entire building or campus can be covered by a single, centrally managed access point.

Early WiMax boosters were talking about ranges of up to 50km from the base station. Those claims have been somewhat toned down, however, as reality has set in. Early practical tests have indicated that radii of 7 to 15km are achievable from well-placed antennas – still a considerable range. According to Unwired's Amanda Wallace, its current technology from Navini has a practical range of 3.5 to 14km, depending on the terrain.

The big gain for consumers, of course,

is that the introduction of WiMax will result in equipment that is not proprietary, and thus cheaper. Intel always has plans to produce chipsets that incorporate WiMax technology, and most of the other industry heavyweights have thrown their support behind WiMax.

The speed of WiMax, like that of the existing proprietary technologies, will very much depend on how much spectrum service providers are willing to buy and use, and how many cells they're willing to build. WiMax is designed to work across a massive spectrum range, so in theory at least, aggregate data speeds of 70Mb/s or more are possible. Radio spectrum is not cheap, however, and we expect that service providers will at best attempt to keep pace with ADSL, not outstrip it.

There are actually several flavours of WiMax. First there was the base 802.16, which specifies that WiMax operate in the 10 to 66GHz range. This was followed by 802.11a, which extended the spectrum to the 2 to 11GHz, which is more practical, as this is the range in which most providers already have spectrum. It can operate in the unlicensed bands, but is likely to encounter heavy interference in those bands.

The standard that is most interesting service providers, however, is the not-yet ratified

MOBILE PHONE DATA SERVICES

In spite of many years and much wailing and gnashing of teeth, we're still waiting for decent and affordable mobile data services.

First there was GPRS (general packet radio service), which was seen as the stepping stone to 3G broadband data services. It doesn't exactly deliver broadband speeds – technically it's capable of 114Kb/s, but practically it's limited to about 33Kb/s and is hellishly expensive. GPRS usage is often measured by the kilobyte.

More recently, mobile phone network providers have introduced EDGE GPRS. EDGE (Enhanced Data rates for Global/GSM Evolution), in addition to having the cheesiest acronym of all time, triples the effective bandwidth of GPRS, to 384Kb/s (it was, in fact, initially known as GSM384, and is often called 2.75G). Practical speeds max out at about 180Kb/s. It achieves this largely through improved modulation techniques. A lot of new smart phones have started to support EDGE GPRS.

The real future of broadband to mobile phones, however, was seen as 3G. Sadly a malaise seems to have struck the network providers when it comes to delivering 3G data services, and those services that are available right now are both uncompetitive and expensive. Technically, 3G can support up to 1920Kb/s, although as yet those speeds have not been seen.

The only major supplier of 3G data services in Australia is 3 (www.three.com.au), part of Hutchinson Telecom. At the time of writing, it offered 488Mb per month for \$99, with an excess charge of 0.10/Kb (roughly \$1 per megabyte, or \$1000 per gigabyte). It offers speeds of around 384Kb/s. Relative to mobile and portable services like Unwired and iBurst, this is outrageously expensive, and not something many average users could afford.

(at the time of writing, at least) 802.16e standard. The IEEE, moving at its typical glacial pace, is likely to finally confirm the standard at the end of this year or early next. 802.16e incorporates mobility features, giving the service parity with mobile broadband services like iBurst/IntelliCell and 3G.

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LAN showdown: MIMO gives a glimpse of the future

Standard	Range	Max throughput (theoretical)
802.11b	100m	11Mb/s
802.11a	50-70m	54Mb/s
802.11g	100m	54Mb/s
802.11i	Amendment to 802.11 standard, added AES and WPA	Amendment to 802.11 standard, added AES and WPA
802.11n	100m	100Mb/s (500Mb/s w/ MIMO)
802.11e	Amendment to 802.11 standard, added enhanced QoS for applications like VoIP	Amendment to 802.11 standard, added enhanced QoS for applications like VoIP
802.11g (MIMO)	MIMO (Multiple-In-Multiple-Out) can be applied to most 802.11 technologies, but will make its first appearance in the 802.11 standard.	MIMO (Multiple-In-Multiple-Out) can be applied to most 802.11 technologies, but will make its first appearance in the 802.11 standard.

placed to implement WiMax in the near future is Unwired, and at the beginning of 2006 is planning to start importing new hybrid technology from Navini Networks (called Ripwave), incorporating both existing Navini technology and 802.16 support. According to Wallace, as Unwired rolls out into new areas, it will start implementing 802.16e.

In the long term, the key challenge for wireless broadband networks will not be the delivery technology but the means to support everybody who wants to use it. Wireless broadband, like other forms of wireless technology, works in a kind of shared medium. As a user, you're competing for space on the airwaves with every body else who's trying to use it. 70Mb/s per cell with WiMax may sound like a lot, but that's 70Mb/s shared between everybody using the cell. Currently we have ADSL services offering 12Mb/s guaranteed. At that speed, only six people could use a single WiMax cell simultaneously – not exactly an economical situation for the vendor (of course, vendors oversubscribe, assuming that not everybody is going to be using the service at once). Still, as the number of subscribers grows, it will be interesting to see how well wireless broadband providers deal with the problems of a shared system.

THE WIRELESS LAN

The dirty little secret of current wireless LAN technologies is that they work nothing like advertised. The box will tell you 54Mb/s or 108Mb/s, but you'll be lucky to get 15 percent of that speed. If you're in a high-density area, you might also have overlapping wireless networks, all competing for the same slice of radio spectrum that you want to use to transfer your files or stream your video.

We have three major types of wireless local area network in operation today: 802.11b, 802.11g and 802.11a. Operating at 11Mb/s, 802.11g is the standard we know best as Wi-Fi. Later came 802.11g and 802.11a. The former, using the same spectrum as 802.11b – and being backward compatible with it – has become today's most popular wireless LAN technology. IEEE 802.11a, often seen as the poor cousin of 802.11g, works very similarly (including having a 108Mb/s "Turbo" mode),

but uses a different spectrum band (see sidebar, *Crowding the ISM band*).

The hideous inefficiency of 802.11a/b/g is a result of numerous factors: heavy crowding and interference in the 2.4GHz band; poor handling of bouncing signals; Ethernet-like contention mechanisms; the need for heavy encryption to ensure security. All these add up to a service that's not quite as advertised.

The solution to the problem of poor efficiency lies with 802.11n – a standard that's currently being argued over by members of the IEEE. It's unclear when a standard is due (sometime in 2006 is the official line), but several competing camps have to agree before the issue is finally settled.

What everybody has agreed on is the use of MIMO (multiple input, multiple output) antenna technology to deliver much greater spectrum efficiency and throughput than existing technologies.

MIMO is a technical solution that uses multiple send and receive antennas, combined with modulation and multiplexing techniques similar to those used by digital television transmitters. In addition to a technique called spatial division multiplexing (SDM), which uses the physical separation of multiple antennas to multiplex signals, it uses multipath (that is,

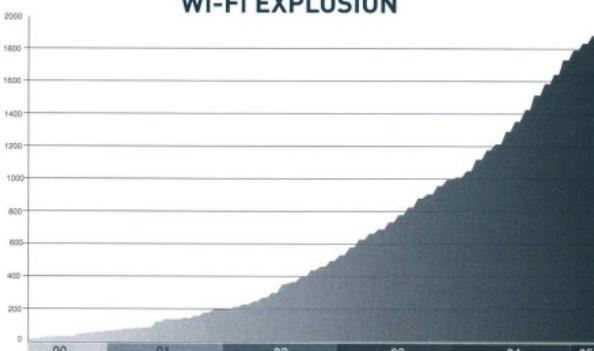
bouncing) signals to increase the throughput or reduce errors in the wireless transmission. MIMO can deliver up to six times the speed of 802.11g transmitters, and up to eight times the range.

There has been an unfortunate tendency, however, to conflate MIMO technology with 802.11n, which many buyers of so-called "Pre-N" technology may find out to their misfortune. Belkin got the ball rolling late last year when it launched the Belkin Pre-N router. The router uses chips from Airo Networks and sports three antennas. Based on a draft spec of the 802.11n standard, the Pre-n router delivered, according to multiple practical tests, up to 40 percent efficiency on its 108Mb/s specification. That's roughly the same efficiency that Fast Ethernet delivers, and certainly enough to support video streaming, even of high-bandwidth video streams.

The problem with the Belkin Pre-N – and other allegedly Pre-N wireless access points and routers – is that it only works with their own proprietary wireless cards. There's no official standard yet, so Belkin just 'filled in the gaps' as it were. When the standard is ratified, it's entirely possible that the Belkin will not interoperate with 802.11n devices.

There are two key groups fighting over the ►

Wi-Fi EXPLOSION



This chart graphs the number of certified wireless products in thousands, from March 2000 to January 2005.

final implementation of 802.11n: the WWISE (WorldWide Spectrum Efficiency) Group, and TGn Sync (Task Group N Synchronisation) group. The former wants to use the ISM band used by 802.11b/g and make it backward compatible. TGn Sync wants to use the 5GHz spectrum (used by 802.11a) and push radical new bandwidth levels.

Both have a minimum goal of 100Mb/s sustained throughput with high spectrum efficiency. Members of the TGn Sync Group believe their plan can push up to 500Mb/s using four transmitters, although 250Mb/s using two transmitters is seen as a more realistic goal.

The WWISE group would prefer to use less spectrum (20MHz bands – which is what 802.11g works in – as opposed to 40MHz bands of TGn Sync), which would conserve increasingly valuable radio spectrum. The result would be speeds of around 135Mb/s initially, with a long term goal of 540Mb/s.

THE WIRELESS PAN

Ever since the introduction of Bluetooth, there's been a lot of talk about wireless personal area networks, but not much action. Most of the interest in PANs has been related to its use in smart mobile phones, for synching with PC software, for instance, or for using wireless ear pieces. It has also started to be used for devices like wireless headphones, with the digital audio transmission offering crystal clear audio.

Current implementations of Bluetooth technology tend to use it as a peripheral cable replacement for a limited range of appliances, rather than as a tool for allowing the multitude of devices stored around the home or office to communicate directly.

But the long term vision is much larger. Many home appliances that would benefit from wireless connectivity have not even been considered. We're talking about games consoles that can talk wirelessly to routers, digital set-top boxes that can transmit digital TV to your PC or to multiple screens around the home, media servers that can wirelessly broadcast music to arbitrary sets of headphones within range, cameras that talk directly to printers and portable MP3 players that can wirelessly send their music to your home stereo. These are the kinds of interconnected applications that consumer electronics nerds dream of, but have yet to see.

In part, it's because Bluetooth is not yet up to the task. It has made some strides, especially in the area of wireless audio transmission. The Bluetooth A2DP (Advanced Audio Distribution Profile) standard, for instance, allows a PDA supporting the standard to talk directly to wireless headphones, without the need for an

intermediary base station.

But Bluetooth is not fast enough for video applications, not by a long shot. Bluetooth is currently capable of transmitting 1-2Mb/s to a range of about 100m with an output power of around 100mW. That's good enough for audio, and for input devices and printers, but digital television requires a minimum rate of 7Mb/s. If you're looking at transmitting high-definition television, you need a system capable of handling 20-24Mb/s.

The current starring technology for personal area networks is UWB, aka 802.15.3a (yes, another IEEE standard). Sadly, UWB has recently been transformed from a promising technology to a cautionary tale about standards processes that go wrong. Ultra Wideband has been tossed around the IEEE for well over a year now, without much progress. It was meant to be the PAN technology to which all other PAN technologies bowed, but we're not even close to seeing it appear in the real world. The good news is that in June a cabal of industry heavy hitters called the MultiBand OFDM Alliance joined the IEEE ultrawideband working group and starting pushing the standard.

The reason they're so interested is that UWB has so much potential. UWB transmits extremely short bursts of data – less than one nanosecond – over a massive spectrum band. In the US, spectrum has already been approved for use by the technology.

Over very short distances, UWB technology is capable of transmitting data at up to 1Gb/s with a low power source (approximated 1mW). Given its wide spectrum band, UWB is less likely to suffer from crippling interference than other wireless technologies, and because the transmission power is so low, it causes little interference in other devices.

Its expected range is just 10m, and in spite of its standards problems, it's widely expected that UWB technology will have a place in both the wireless version of USB and in the next iteration of Bluetooth technology.

Although many of the wrinkles have yet to be ironed out, UWB is expected to make use of much of the work into authentication that went into the 802.11 standards. It's crucial, for instance, that your UWB media server cannot be hijacked by somebody who just wanders past your front door.

PANs – Wireless USB comes out on top

WIRELESS USB

Currently in development by Intel, but with no announced launch date, we can expect to see wireless USB [WUSB] in PCs in the next few years.

Understanding wireless USB does not require any leap of logic: it is, for all intents and purposes, simply USB without the cables. The USB host [the PC] retains the same relationship with the peripheral devices that it has with wired USB, and the expected standard will even support the same number of devices: 127 per host. Like wired USB, the host schedules and manages all data communications – it's not a symmetric relationship like Ethernet.

Using UWB, wireless USB has a projected bandwidth of 480Mb/s at launch – the same as that of wired USB 2.0.

One of the goals of USB, especially in multi-user scenarios, is to allow more than one device to be connected to the peripheral at a time. A printer supporting wireless USB could have four or five office workers connected to it and printing to it directly, for instance.

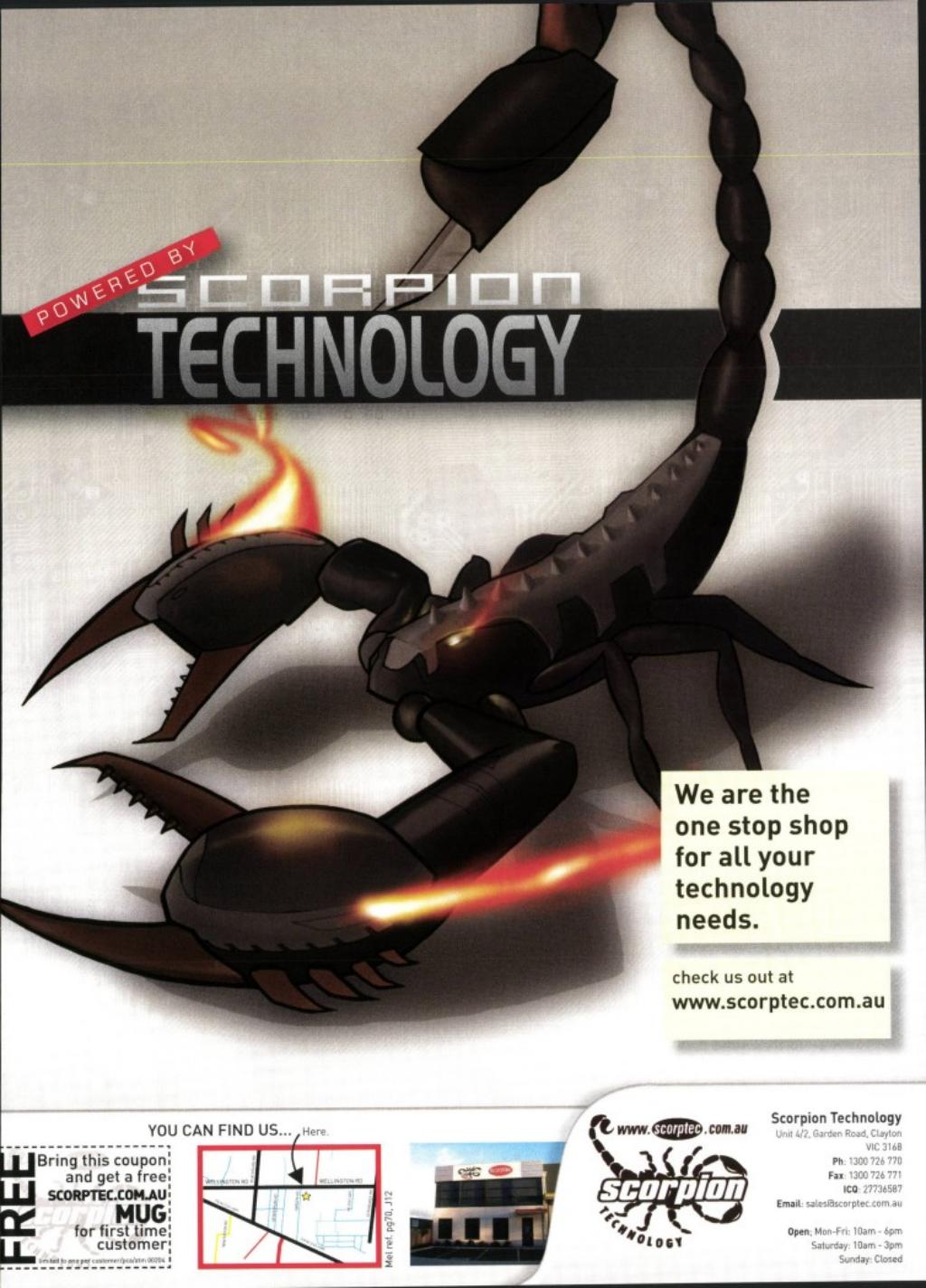
Intel is also planning to implement a security system that is designed to authenticate users before they can be given access to the device capabilities. At this stage how this will be done is unclear, but according to Intel it is vital that the device and host be 'paired' in some fashion that ensures the security of both the device and the host, and prevents anybody within range from simply walking up and using the device.

The vision of Intel and other UWB boosters is that UWB will act as a kind of universal transport layer for short-range wireless applications. In this vision, a future version of Bluetooth uses UWB as its transport and media access control layer, as does wireless USB. The higher level protocols take care of the application specific implementation. UWB is seen by many as a core component of the wirelessly connected world, driven by open standards that allow all devices to communicate with each other. At short range, we have UWB; at medium range 802.11n; and at long range WiMax will deliver high speed Internet access to our home – or wherever else we may be.



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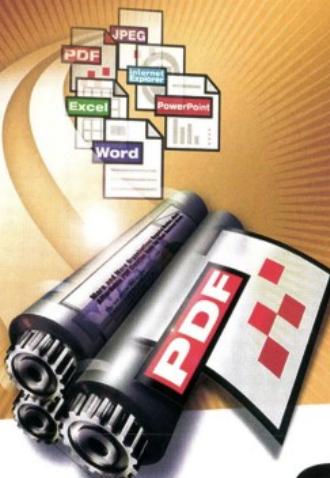
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QUESTIONS & ANSWERS

David Moss solves some USB riddles, delves deep into the Windows Registry and even has time for a Spybot query.

USB BEING AN SOB

QI have a Canon 3200F USB 2 scanner. The scanner works perfectly, except for when the computer resumes from standby. If I try to scan from within an application after resuming from standby, I get two error messages. The first one says: 'Cannot communicate with scanner, cable may be disconnected, check status, scanner driver will be closed.' The second says: 'Unable to initialise scanner, check scanner connection and scanner software.'

Device Manager sees the scanner and reports that it's working properly. If I disconnect and then reconnect the USB cable, the scanner works as it should.

Canon technical support has advised me that I have problems with my motherboard. I don't think so, as my USB ADSL modem works perfectly all the time, as do my other USB devices.

I'm using the high-speed USB cable that was shipped with the scanner, and I'm running Windows XP SP 2.

A Carman

AI suspect Canon technical support is right, and that an embedded chipset on your motherboard may be the culprit. You'll probably find it useful to peruse some of these threads on the Everything USB Community forums. The main Canon forum is: www.everythingusb.com/forums/forumdisplay.php?5=0b7411bc0f9d21e32e0f9

READER'S TIPS: PORT RANGES IN XP FIREWALL

In August 2005, I was asked for a way to configure a range of ports in the Windows XP SP 2 firewall, but I wasn't aware of one and invited people to send me solutions. Reader Richard Ashford immediately leapt in with a perfectly good Windows script that does exactly what's needed:

```
' Script to Open a range of ports in
Windows XP Firewall
Option Explicit
```

```
' This is the Start port [0]
Const PORT_START = 100
```

```
' This is the End port [0]
Const PORT_END = 101
```

```
' PROTOCOL can be "TCP", "UDP"
or "ALL"
Const PORT_PROTOCOL = "TCP"
```

8333a6af1&forumid=84

Here's a thread on the Canon 3200F scanner: www.everythingusb.com/forums/showthread.php?5=0b7411bc0f9d21e32e0f9&e8333a6af1&threadid=5161

Here's another about Canon scanners not working under USB 2: www.everythingusb.com/forums/showthread.php?5=0b7411bc0f9d21e32e0f9&e5423

I hope you find a solution there, but please also look at my tips this month, as one has a pointer to another interesting article.

WINDOWS FORGETS

QOne thing has been bugging me for years, and with larger monitors becoming more common I'm sure I'm not alone. Every time I open a Windows Explorer window, it's the same size and it's too small to show the filename, type, size and date, so I always have to resize it. In particular, the modified width is too short, so it truncates the time, with the right margin being wasted with blank space. Have you any idea how to change this? I've searched in the Registry, but can't locate it.

P A Bristow

AA well-known problem, caused by Windows having a limit on the number of settings it can remember. By default, these limits are 200 local folder and 200 network folder settings (and that 400 total includes Views as well as sizes, so you can see

```
' Define Variables
Dim objShell, iLoop
```

```
' Shell Object used to Run the
NETSH command
Set objShell =
CreateObject("WScript.Shell")
```

```
' Loop through ports and run the
NETSH command
```

```
For iLoop = PORT_START To PORT_END
objShell.Run "netsh firewall set
portopening protocol = " & PORT_
PROTOCOL & " port = " & iLoop
& " name = " & "Port_ & " & PORT_
PROTOCOL & " & iLoop & " "
```

See David's Tips 1: Windows scripts, opposite, for how to use the script on your system.

just how quickly they get used up). The entries are in the Registry and you'll find them at the following locations:

HKEY_CURRENT_USER\Software\Microsoft\Windows\Shell\Bags
HKEY_CURRENT_USER\Software\Microsoft\Windows\ShellNoRoam\Bags

This was supposedly fixed in Windows XP SP 2, and there's a Microsoft Knowledge Base article that says precisely that: <http://support.microsoft.com/kb/813711>

This article also shows how to create a new entry that allows you to establish the number of folder settings that can be stored. On my system, I note that I have 172 entries currently under the Bags key.

If that doesn't work, you may find a free utility called AutoSizer from South Bay Software useful – go to www.southbaypc.com and follow the Free Utilities link. Unless you enjoy Internet Explorer, Outlook Express or Notepad being maximised, I suggest you don't let AutoSizer set those windows for you when it starts up. I had to unmaximise a lot of windows after thoughtlessly clicking OK.

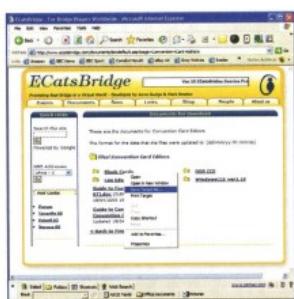
DOWNRIGHT AUTOCADDISH

QI was trying to set up a file server using WXP (NTFS) as a platform, and came across a problem no-one seems to be able to explain. Three of us need the ability to access files within a folder on the file server. Admin needs full access for backup and so on, but the rest of the users on the network shouldn't be allowed to delete files or directories. To be specific, users need file and folder access, permission to read existing files within the folder and to save new files, but not to change or delete anything once it's been saved.

I was able to adjust folder security and permissions to achieve this. It worked with all Windows applications and third-party files such as OpenOffice, but as soon as we tried to save AutoCAD LT files the error message 'Can't save file, saving file as TMP instead' was displayed. I can rename the TMP files, but the user can't, so saving files is pointless. What is AutoCAD LT doing that needs different permissions to save files?

John

AI had a hunt around and found an article in the AutoCAD LT knowledge base online at [http://usa.autodesk.com/adsk/servlet/ps/item?id=2867755&linkId=2475874&siteId=123112](http://usa.autodesk.com/adsk/servlet/ps/item?id=2867755&li nkId=2475874&siteId=123112). It applies to AutoCAD LT 2002 (I'm not sure what version



AIf 'Save Target As' is greyed out on your context-sensitive pop-up menu, the culprit might well be a browser setting, or it could simply have been coded that way on the website.

you're using) and talks about users having to be members of the Power Users or Administrators group to use the software. If this doesn't help, I suggest you contact AutoCAD directly for support.

LOST A BUTTON

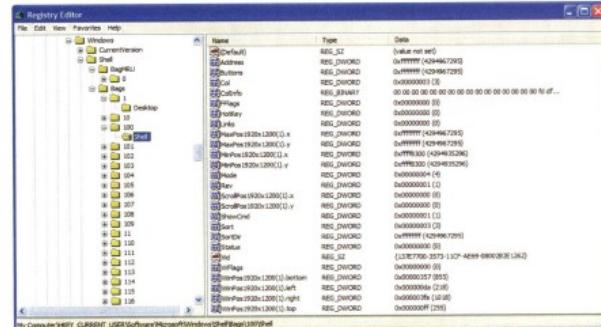
QWhy is it that I can't get my right mouse button to work on web pages? I'd expect a menu to appear, but nothing happens at all when I right click on a web page.

G Johansson

AI think right click functionality has been deliberately turned off in code, which is quite easy to do in, say, JavaScript like so:

```
document.oncontextmenu =  
function()
```

Alternatively, I've seen it done using the HTML <body> tag, thus:



DAVID'S TIPS 1: WINDOWS SCRIPTS

To use Richard Ashford's script opposite to open a range of ports in Windows XP Firewall, open Notepad and type in the code, modifying the Start and End port data to your requirements and picking the port protocol you want to use. Thus, if you wanted to open the port range 2222 to 3333 using the TCP protocol, the relevant lines would change to the following:

```
' This is the Start port (2222)  
Const PORT_START = 2222
```

```
' This is the End port (3333)  
Const PORT_END = 3333
```

```
' PROTOCOL can be "TCP", "UDP"  
or "ALL"  
Const PORT_PROTOCOL = "UDP"
```

```
<body oncontextmenu="return  
false;">
```

Both these examples will disable right click and Context menu functionality. Here's a quick HTML file I've made to illustrate this:

```
<html>  
<title>Test right-click</title>  
<body oncontextmenu="return  
false;">  
<p>Hello World</p>  
</body>  
</html>
```

Interestingly, when I tried to load this file into Internet Explorer, it refused to run the oncontextmenu code (when set to its default mode under Windows XP SP 2) until I'd said that it was OK. Before I'd done this, I could right click away to my heart's content, but afterwards right clicking was instantly disabled.

Save the script not as a text file but as a VBScript file. To do that, when you have the Save As dialog open, change the Save As Type to All Files and name the file with a VBS extension.

There are then three ways to run your script: double-click on it in Windows (it runs just like a normal executable file); go to Start, select Run, type in the name of the script and hit Enter; or fire up a Command Prompt, type the name of the script at the Command Prompt and hit Enter.

By doing that, you're using a built-in Windows tool called the Windows Script Host that handles the running of scripts. To find out more about it and Windows scripting in general, visit: <http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnanchor/html/scripting.asp>

LOST ANOTHER BUTTON

I browse the Web mainly for learning materials, preferably free downloadable books and articles, for my students and myself – text books for engineering, construction and computing, as you're probably aware, cost the earth nowadays. Anyway, to my point: when downloading PDFs in particular I've always found it useful to right click on a link then click on 'Save Target As...' to download the file without having to wait for it to open in Adobe Reader, but for some reason when I right click now in Internet Explorer 6 it's greyed out in the table of choices.

G Ward

As with the last question, I think you'll find the Save Target As functionality has been deliberately turned off in code by the web page. However, an alternative cause might be your having Internet Explorer Content Advisor turned on; if that's the case, the only way to resolve the problem is to turn Content Advisor off via the Content tab of Internet Options in Internet Explorer (Tools | Internet Options | Content). If it's been turned on by code, there's very little you can do about it.

PUSHY EXPLORER

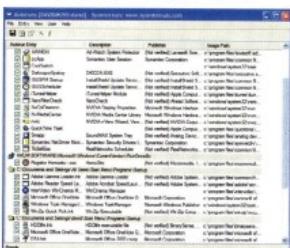
My office runs a mixture of Windows 98, 98 SE and XP. On certain PCs – not all – at startup, the Windows Explorer folder appears on the Desktop. I've trawled

Is Windows not remembering the size settings for folder windows? You might have run foul of the store that can only handle size settings for 200 folders (and a further 200 network folders). ▶

through the various startup and more obvious Registry settings on these PCs, but can't find the cause of this. All the PCs are protected by a combination of anti-virus/trojan and firewall packages, none of which show up anything adverse.

P Stephen

A With any issue like this, fire up the Microsoft System Configuration Utility and use that to help diagnose your problem. Head for Start, select Run, type msconfig into the edit box and hit Enter.



▲ The Sysinternals Autoruns applet is handy when you want to know the location and number of items that are being run at system startup.

Once the utility starts, select 'Diagnostic Startup – select basic devices and services only' and then restart the machine. If the folder no longer appears, you'll find it's almost certainly something in Startup that's causing it to appear, and you can use the Startup tab of MSConfig to try to locate the offending item.

Although I find MSConfig useful, if I just want to look at what's auto-running on a system I prefer Autoruns from Sysinternals, authored by the excellent Mark Russinovich and Bryce Cogswell. It comes in two versions: one with a GUI and one for those who prefer a command line interface. It runs on any Windows version – just download from www.sysinternals.com/ntw2k/freeware/autoruns.shtml, unzip it and run. You'll probably be surprised by how many autorun entries there are, and how various their locations. You'll see one entry at the Registry key `HKEY\Software\Microsoft\WindowsNT\CurrentVersion\WinLogon\Shell`, which is for explorer.exe and is labelled as Windows Explorer. This is correct, but it's not something you want to delete, as it starts the Windows Shell and is present only so you can install alternative shells.

PARANOID SPYBOT?

I use Spybot-S&D to look for spyware on my PC and also have F-Secure Anti-Virus 2005 installed. Since the

DAVID'S TIPS2: USB ISSUES REVISITED

While looking into a problem raised by a reader, I discovered an interesting new article in the Microsoft Knowledge Base, which had nothing to do with the reader's problem but opened my eyes to a fault I'd already encountered and had actually fixed by messing with connections until the printer worked again. I hate fixes that work without knowing why, so I was especially pleased to discover this article.

The problem I'd been having was with a Windows XP SP 2 box, a USB 2 printer and a USB 2 hub. Basically, removing the printer from the system caused the hub to stop.

As you might imagine, I wasn't pleased, having gone out of my way to ensure that every damn USB item on the system was USB 2. I'd solved the problem by plugging the printer directly into the hub, rather than into one of the USB 2 ports on the system box, but I had no idea why this made things better. I'd pushed it to the back of my mind for a while, but hadn't given up hope of finding out the reason.

It turns out that this is a case of Windows being overactive in the power conservation department. There's a feature called Selective Suspend Mode that's mostly used on laptops to conserve power, and which is supported by the USB core stack so a driver can use Selective Suspend Mode on USB devices to put them into low-power mode when they're idle. This, however, doesn't only kick in when a computer switches to standby; it's operational at all times, including when the system is in full swing.

I discovered that any/all of the following devices can be made idle:

- The host controller
- The USB hubs, including the root hub
- The full range of USB devices that are supported by the operating system.

There are three fixes available, the first being the one I stumbled upon, that plugging the printer into the hub and then removing it rather than using the built-in ports on the system makes all well. The second fix is to disable power management for the USB 2 hub, which obviously might not be ideal on a portable, but might save you problems on a desktop. The third fix is to get down and dirty with the Registry and disable Selective Suspend Mode for every USB host controller in the system. Once again, not recommended on a laptop, but could well provide a solution on a desktop. To disable the power management on the hub alone, right click on My Computer, select Manage and then Device Manager.

Go to the View menu and select 'Devices by connection', then look for a node that has a header like one of the items below, and click on it to expand the tree:

- ACPI Multiprocessor PC
- ACPI Uniprocessor PC
- Advanced Configuration and Power Interface (ACPI) PC
- Standard PC.

Look for the PCI Bus entry and expand that and then look for the entry that includes the words 'Enhanced Host Controller' and expand that (on my system it read: 'Intel(r) 8280 10B/DBM USB 2.0 Enhanced Host Controller'). You should now be looking at an entry that says 'USB Root Hub'. Right-click on that and select Properties, navigate to the Power Management tab and clear the checkbox labelled 'Allow the computer to turn off this device to save power'. Hit OK when you've finished.

If you want to go the whole hog and disable Selective Suspend Mode for all controllers, then it's off to the Registry in search of: `HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services`

Once there, create a new subkey called 'USB' from the Edit menu's New and Key menu items. Click on your newly created subkey, head once more to the Edit menu, select New and then DWORD Value.

Call the value 'DisableSelectiveSuspend' and, once it's created, right-click on it and choose Modify. Type the number 1 in the Value Data edit box and then hit Enter. If you ever want to re-enable Selective Suspend Mode, simply change the Value Data to 0.

Be aware that if you do this, you'll lose the ability to apply the option on the Power Management tab used for the second solution because the 'Allow the computer to turn off this device to save power' checkbox will no longer appear.

▼ If you're having problems with USB 2, a feature called Selective Suspend Mode might be responsible. Head to the Power Management tab to prevent this feature being active on the root hub.



end of April, Spybot has been detecting BackWeb files as 'spyware'. I'm sure you're aware that BackWeb files are used by F-Secure to update virus definitions. Why is Spybot detecting them as 'spyware'? Is this an accident or some terrible commercial thing?

If I let Spybot remove these files, next time I boot I get the error message 'Runner Error - Invalid BackWeb Application 4476822' and F-Secure's fantastic daily update stops working, although virus protection appears to still be enabled. Ad-Aware, McAfee or Microsoft's AntiSpyware Beta don't pick the BackWeb files up. Something fishy is definitely going on!

B Maxfield

A As a long-time happy Spybot user, I was surprised to see this problem, so I went to the Spybot website, ran



▲ Just what you want to see after running Spybot, but users running F-Secure might need to make a small change to the threats detected.

products such as F-Secure (or Outpost Firewall, I think) use BackWeb for automated updates, it can also be (and is being) used by spyware products to download files without the user taking note of it. BackWeb has been in our database for quite a long time, not only since April. But before it was set to be ignored by default because of this unclear situation. As we disliked the idea of possible known threats being missed, we introduced a new category of PUPS (Possibly UnPopular Software), which can be seen as optional fixes.

Messing up the F-Secure-Updates was never intended (this would harm our reputation worse than F-Secure's anyway, I'd guess). We recommend F-Secure users to either disable the usage of BackWeb in F-Secure or to reset BackWeb to be ignored by Spybot-S&D! We're currently discussing how to handle this item in the future. One possibility is to still detect it but not to set it to be auto-checked for fix.'

Thanks for that explanation, Flo; timely and helpful.

XDA BLUES

Q I recently got an XDAi2 because it has Wireless LAN built in, but it's causing me nightmares. I've searched all the

'As a long-time happy Spybot user, I was surprised to see this problem.'

forums I know (Googled tool) and can find very little on the subject (maybe a sign of my poor keyword choice, but some people refer to the device as XDAII and some as xda2i).

The XDA sees the WAP and I've entered the key, but just can't get the thing to access the Internet through my access point. There are so many config screens on the XDAi2 and I'm not even sure which adaptor is the wireless one that it's trying to use. I'm getting extremely frustrated, and I'm now wondering if I've set up the LAN incorrectly somehow.

I'd appreciate it if you could help or point me in the direction of someone who knows this stuff inside out. I've just learned by trial and error over the past few years, but can't fathom where this is going wrong.

J R Wright

A The model is actually the XDAII, but as you noticed many references on the Web call it XDAi2 too. I can't be too helpful over its setup, as I don't have one, but I did find several threads on the TekGuru forums dedicated to assorted XDAII problems, so I recommend you ask your question there where a lot of people may be able to help. A couple of threads in particular may be relevant:

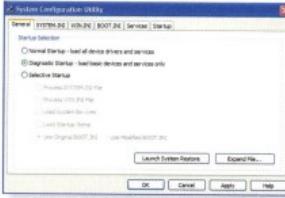
- www.tekguru.co.uk/phpBB2/mob_topic.php?t=5518
- www.tekguru.co.uk/phpBB2/viewtopic.php?t=5898

▲ Use Diagnostic Startup to provide a relatively clean boot in Windows. This is handy for troubleshooting purposes.

a search for BackWeb and discovered that there was in fact a BackWeb threat listed, but it had been there for some time so I wasn't sure why the program has suddenly started picking on F-Secure files (which have been around for a while too).

An email to the folks at Spybot asking what was going on received a reply within a couple of hours. It turns out that there is indeed a connection between the BackWeb threat listed on the Spybot site and your problem with F-Secure – here's the explanation from Flo at Team Spybot:

'BackWeb is a program that enables downloads in the background. While good



For more technical help and professional advice head to:

www.pcauthority.com.au



TUNE UP WINDOWS PART 1

In the first of our three part series, PC Authority shows you how to tune, fix and secure your PC.

While we're waiting for Vista, Windows XP will have many more months ahead of it. So, in the next three months, our Tech Support tutorials will focus solely on keeping Windows XP fine tuned, patched up, and secure.

Before we get started, there are two things you should make sure of before you start any tweaking. First, that you're using the latest version of Windows. You can switch off automatic updates if you don't want it to consume resources and slow down your machine – use the Automatic Updates tab in the System control panel – but that puts the onus on you. Visit the Windows Update site (<http://windowsupdate.microsoft.com>) and download any important updates manually. If you're a victim of anti-Microsoft paranoia, this allows you to download the latest updates then check technical forums for problems before installing. You'll find a Google search

by the update number usually throws up any tweaking troubles.

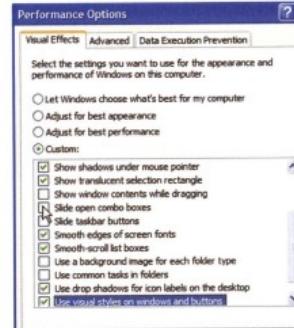
Second, ensure you have the latest WHQL-certified drivers for your hardware, particularly the graphics and motherboard chipset drivers, by visiting the download sections of the relevant websites. WHQL (Windows Hardware Quality Labs) is designed to ensure the compatibility of hardware with Windows. You can use early release or beta drivers for your graphics card, but unless you're a gamer obsessed with maximum frames per second, it might not be the best course of action. Stick to WHQL if you want to guarantee your system stability.

LESS EFFECTS

It's time to tweak. The easiest way to speed up XP is to cut down on some of its cosmetic flourishes. Start by going to the Display control panel (or just right-click on the Desktop). Click on the Appearance tab, then on the Effects button. In this dialog, you can remove or tweak the animation used for menus and tools, switch ClearType (Microsoft's font-smoothing technology) on and off, and remove the shadows from under Windows. On some systems, switching animations and shadows off will add a little zip.

More settings can be found in the System control panel, in the Performance section under the Advanced tab. Under Visual Effects you can find optimal settings for looks or speed, but choose custom settings to get the optimum balance. As a rule of thumb, if the option says 'animate', 'fade' or 'slide' then uncheck it, and get rid of a background image for each folder type. Some prefer to strip everything, but isn't one of the pleasures of using XP that it looks better than 95?

Now click on the Advanced tab, and ensure that Programs is selected for both Processor scheduling and Memory usage. You can also tweak the Virtual memory page file size if you want: some tweakers recommend setting it to twice your system's memory for optimum performance. However, while this was effective in the days when Windows 95 was running on 16MB of RAM, it now makes little difference, and you're probably better off letting Windows manage those settings for you.



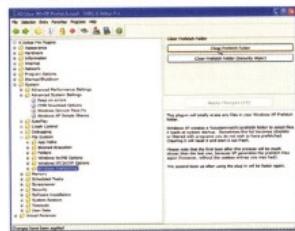
▲ Use custom settings to find the perfect balance between speed and beauty.



▲ Lowering thumbnail image quality can save you time if you use the Windows Explorer to browse through images.



▲ PowerUp XP Platinum is an attractive Windows tweaking package, and it can make your interface prettier too.



▲ Using X-Setup Pro to clear the prefetch cache can give your boot times a boost.

MORE POWER

At *PC Authority*, we've always sworn by Microsoft's PowerToys, a suite of applets that adds extra features to Windows and enables you to change settings without trawling through every control panel. There are several PowerToys available, but the essentials are Tweak UI, the ClearType Tuner, the Alt-Tab Replacement and the Virtual Desktop Manager. The ClearType Tuner is self-explanatory, and really does help to configure the font-smoothing software for your screen. The Alt-Tab Replacement adds a useful document thumbnail to the standard application switching, and the Virtual Desktop Manager lets you switch between four virtual desktops, each configured with various applications and documents.

But the prize PowerToy is Tweak UI, enabling you to change core Windows behaviour without the grind of individual tweaks. You can use the General settings to change most of the effects options discussed,

but Tweak UI opens up a few additional options. Click on Thumbnails under the Explorer options, for example, and you can lower the image quality used in preview thumbnails, speeding things up if you use Windows Explorer to browse through digital images. Also, try switching on Optimize Hard Disk if Idle under the General settings to help keep your local storage in ship-shape fashion.

GET SOME HELP

If you want to go further under Windows' skin, then find the right tool for the task. Norton SystemWorks has a lot to offer here, but there are shareware applications that do a similar job. Try X-Setup Pro. It offers both a control panel interface for advanced users and a wizard-based approach for new ones, and provides advice and warnings as you change settings to stop you doing something you might regret later.

Many of the tweaks affect the interface more than performance, but there are a few that give it a slight boost. The Behind Your Back Wizard, for example, is a great way of sorting the wheat from the chaff when it comes to hidden background processes and programs. While its effects aren't as wide-ranging, Ashampoo's PowerUp XP Platinum offers easy access to many interface and performance enhancements, and looks prettier too.

Lastly, try Tweak-XP from Totalidea. This comprehensive tool offers a large range of

options similar to those discussed above, plus easy access to a few neat tweaks. Under the System Tweaks setting, click on Cache Optimization and – provided you have 512MB of RAM or more – you can force the core Windows XP system to run from memory instead of being paged to disk.

Select Prefetcher Optimization, meanwhile, and you can adjust the way the Prefetcher – the Windows component that monitors programs during startup and configures the operating system to preload chunks of program code

in preparation – works. If you swap between different sets of types of application, resetting and re-initialising the Prefetcher after you change clears the system and helps Windows adjust for a new set of tasks. Tweak-XP even includes an Auto-Tuner option, but as one side-effect of this was to remove all our test system's cosmetic options and leave it looking like a Windows 95 museum piece, it's probably best avoided.

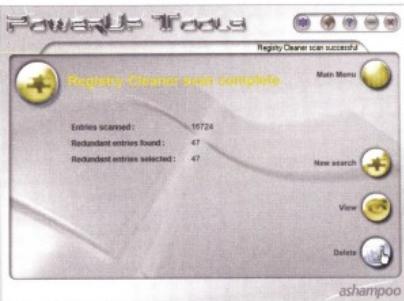
MANAGE THE REGISTRY

The Registry lies at the heart of everything Windows is and does. Every application you use and Windows setting you alter changes information (or a key) in the Registry, and as a result it gets more bloated the longer Windows runs. It's possible to clean it by using the regedit command prompt utility, but it's time-consuming and potentially dangerous. It's all too easy to delete a vital key.

Cleaning and maintaining the Registry is different from hacking it. There are many Registry hacks that claim to enhance Windows performance, but most are irrelevant to current technology. For example, one common hack designed to optimise XP's use of the CPU's onboard Level 2 cache by setting a specific value will, according to Microsoft, only work on Pentium and Pentium Pro systems, and have no effect on superior CPUs.

It's a similar story with another optimisation that claims to speed up Prefetcher performance. Going to HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Session Manager\MemoryManagement\Prefetch Parameters and setting EnablePrefetcher to 5 will not give your system a big boost.

Jus manage the Registry, using a good system utility or a specialist Registry Management tool. Both TweakXP and PowerUp XP Platinum include a Registry clean-up feature, the former allowing you to choose which suspect keys to clean, the latter allowing you to set how aggressive or cautious its cleaning should be.



▲ Many Windows system utilities include their own Registry cleaners.

Alternatively, download TweakNow RegCleaner. This simple, speedy app scans the Registry for duplicate or obsolete keys, then divides the questionable entries into 'safe to delete', 'not fully safe to delete' and 'unknown', leaving you free to clean with confidence or take risks if you know what you're doing.

FILE SYSTEMS AND DEFRAZ

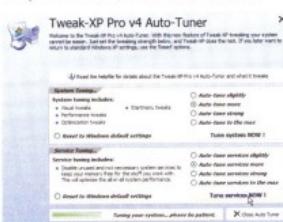
Windows XP handles its storage system much better than older versions, particularly if you use NTFS over FAT32, and these days there's very little reason not to.

To check this, open My Computer, right-click on your hard disk and select Properties. If the File System reads FAT32, it's time for a rethink. Unless you dual-boot between XP and Windows 98 – and these days, why would you? – then you should use the Convert file system command-line tool and convert to NTFS as soon as possible. It's more secure, more efficient in its use of hard disk space, and better at recovering data in the event of a crash. Even Dual-Boot Linux systems can cope with NTFS these days, albeit with some slightly scary write limitations.

However, Windows still needs help rearranging the data on your hard disk into logical, sequential lumps. Employ the System Tools Disk Defragmenter on a monthly basis, and more often if you use particularly data-intensive applications – especially audio or video-content creation. Doing so before starting or after finishing a new project will help your hard disk deal with the huge quantities of data involved.

Curiously, there are two files that the Windows Disk Defragmenter won't touch: the Registry and the Virtual Memory page file. As these two files see more action than any others, a defrag can help your system run much more effectively.

Download PageDefrag from www.sysinternals.com. This app can reduce fragmentation on these vital system files, and give a noticeable performance boost on some overworked machines.



▲ Tweak-XP's Auto Tuner optimises Windows XP, but it can also throw out the visual baby with the animation bathwater.



▲ This handy option forces the core Windows XP system to run from memory, not the hard disk.



OFFICE GOES XML

Jon Honeyball looks at Microsoft's new file formats and its Indigo strategy, as well as Apple's move to Intel processors.

Microsoft has made a major announcement over the future of its Office file formats, and to understand the profound nature of this change a little history is in order. For many years, Microsoft has been using private file formats for storing Office data files: for example, in the case of Excel, this was called BIFF (for Binary Interchange File Format, if memory serves). In the mid-1990s, Microsoft changed the Office formats to accommodate Structured Storage, which was an object-oriented storage technology from the OLE (object linking and embedding) team.

In a nutshell, a structured storage file was a complete filing system contained within a single file. The internal data structure was identical – just as an NTFS file system has the same basic form on all NTFS formatted disks – but the data that you poured into each ‘file’, or ‘stream’ as it was called, was unique to each application. This meant that all Office files, whether they were XLS, DOC or PPT, were structured the same internally, but the nature of the data in the various streams was different, depending on the application. In essence, to take the example of Excel, Microsoft just poured Excel BIFF format data into the primary stream of the structured storage file.

Structured Storage was pretty well documented by Microsoft, but it did require you to use the OLE libraries to access the data, which was a significant problem for vendors on other platforms like Linux and Apple, because they had to do the hard work of replicating the OLE libraries for structured storage access. Once you’d got into the primary stream, you had access to the native data for that application, but this wasn’t documented unless you signed up to significant NDAs (non-disclosure agreements) with Microsoft. This added yet another layer of complexity to the whole reverse-engineering problem for vendors who wanted to read and write Office files.

There’s no question that Microsoft used this technology lock-in to keep customers on the Windows platform and using real Office as opposed to its rivals. Moving to a competitive product was too horrible to contemplate, because you’d have to take care of any of the numerous glitches that could occur when using a third-party application to read an Office file.

With Office 2003, however, Microsoft turned the tables on us yet again. It published an XML schema for the office file formats of Excel and Word. These XML file formats were very complete, lacking only the most esoteric of functions (arbitrary text angle rotation in a cell in Excel being one that I remember). These new file formats were published on the Microsoft website and were available for anyone to use, even purveyors of competitors products, but you did have to acknowledge that Microsoft owned the intellectual rights to the file formats. At that time, there were howls from Microsoft’s competitors that it was doing this merely as a short-term measure and that there was no way Microsoft would follow up on its new openness. They noted that XML wasn’t the default file format, and that remained the traditional binary format.

Well, with this new announcement about XML support in the forthcoming Office 12 release, Microsoft has in fact delivered the next stage, and it’s most significant, not merely because Microsoft has extended the scope of XML file formats to include PowerPoint, but because it’s going to make XML the standard, default format for all Office components. In other words, the old OLE structured storage binary format is now considered legacy technology. The new files will be called DOCX, XLSX and PPTX to differentiate them from the binary versions.

So why has Microsoft suddenly decided to open up its file formats this way? Well, the gamble it’s taking is a simple one: there’s no value in having a closed, proprietary format anymore, so we might as well open it up, but we’ll make sure we supply you with the best tool for manipulating that data. So, the story goes, although Word DOCX files will be able to be read and written by any old tool under the sun including Notepad, the best tool for handling them will still be Word itself,

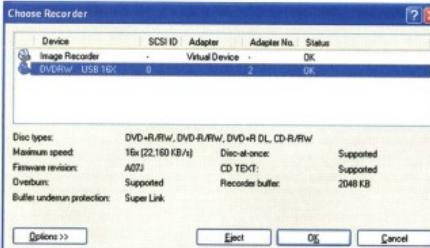


▲ Dinosaurs and Microsoft Office – whatever could Microsoft be referring to?

and the same goes for Excel. Microsoft will be providing a number of important tools with the Office 12 release too. First, there’ll be a tool that scans across all your hard disks, both in your local storage and on the server, and automatically converts all old format Office files into new XML format versions. Then there’ll be a set of converter filters for Office 2000, 2003 and XP, which will allow them to read, edit and save in the new file formats.

There might be some companies that want to stick with the old file format and have nothing to do with the new XML world. That’s fine too, as by using a group policy you’ll be able to force all the machines to use the old native format if you wish. Why would you want to do that? Well, in the past, going to a text-based XML file format could result in a significant file-size increase, which is to be expected when you replace each bit in a binary byte with a text string or character. Microsoft is countering this problem in Office 12 XML format by compressing each file using the ZIP algorithm. Such compression will be on by default and will basically zip up each file into its own little package – open it up with an unzipper and you’ll get the raw, text-based XML file format.

So is this all going to be worth it, and what’s the benefit to you and me? Well, moving away from proprietary file formats is a good thing, period, and should be encouraged if only because it ups the ante for the competitors, who won’t be able to



▲ Nero now supports dual-layer DVD burning – but can you afford the discs?

whings that 'our product would be just as good as Word/Excel/whatever if only we weren't locked out by the file format'.

Now the competition will have no excuses and will have to provide full file compatibility, or else admit that their tool isn't as good as the Microsoft equivalent.

The real benefit, though, will be in the use of Office data files outside of the Office applications that created them. I'll now be able to trawl through my Word documents looking for important topics without having to fire up Word to do the work for me. I'll also be able to create a document production system that writes out Word documents and templates, just by stringing together the Word XML components and writing the file to disk. I'll even be able to drill into the results calculation in an Excel spreadsheet just by reading the file, without starting up Excel.

There's a galaxy of possibilities here, and Microsoft and the industry need to move fast to make the benefits clear. This is a much bigger event than just a file format change and, despite all gloomy predictions to the contrary, Microsoft has kept to its promise about making these file formats both open and up-to-date.

DOUBLE-SIDED BURNING

I needed a new external CD/DVD burner last week, so I dropped into my local shop to see what was available. I was astonished to see that the prices for super-fast DVD burners that do all formats have fallen dramatically, so I added one to my basket, happy in the knowledge that I could plug it into anything from a desktop PC or a Mac to a rack-mounted server. I also noticed that it would support DVD double-layer discs. The price of these discs is still laughably prohibitive compared to single-layer discs, but they appeal to my toy-buying nature, so a five-pack fell into the trolley too.

Back in the office, I connected the drive to my XP SP 2 test machine and installed a recent build of the ever-wonderful Nero

software. It found the drive and told me it supported double-layer DVD burning, so I lined up some 6GB of data to be burned, popped in a shiny DVD+R blank disc and hit the Burn button. Twenty-one minutes later, I had a perfectly functional dual-layer disc with room for another couple of gigabytes of data if I so chose. This is great stuff, and the only downside is the ridiculous cost of the media, which has to drop (and drop fast) if it's not to be edged aside by the new blue-laser-based products that are coming to market soon.

Would I use one for archiving data for the long term? No, I'm afraid not – I want a proper WORM (write once, read many) drive technology for that, designed for the purpose of archiving.

'The real benefit will be in the use of Office data files outside of the Office applications that created them.'

I'd worry that these DVD+R dual-layer discs might 'go off' over time and lose my precious data. However, as a media mover or short-term archive, it offers double the capacity of the standard DVD media. I just wish it was only double the cost per disc rather than vastly more.

MOOD INDIGO

I recently had the opportunity to sit down with the major architects of Indigo, Microsoft's new middle-tier strategy. You can always tell that the firm knows it has an uphill battle to fight when it has to bring in some of the heavyweights from the US.

The essence of Indigo is to replace all the existing communications channels between a client application and a server application, and to provide better capabilities by so doing. When I say it replaces the existing ones, I should point out that Indigo supports everything Microsoft has supplied so far; so if you're currently programming in

MSMQ, you're invited to this party too. Similarly, if you've been working in ASMX or .NET Remoting or .NET Enterprise Services, you'll find that Indigo replaces all of these.

The real power of Indigo is that it turns everything into a SOAP-based web service, where everything works through XML. Service contracts bind everything together, so each end point only needs to know what it needs to know. If you want to use synchronous remote procedure calls, or asynch messaging with optional persistent queuing, or even event-based communications, all of this is possible. What really struck me, though, was that a single service can expose multiple endpoints, each of which supports different communications options. This makes it easy for an object to communicate in different ways with different clients. The nitty-gritty of complex options groupings, such as the protocol combinations and security settings, get dropped into configurable bindings, which enables you to change the deployment design without

changing any source code. This level of abstraction means you can go from one set of transport protocols to another without worrying about the underlying design of the applications, or you can change out the security components and replace them too.

I'm very excited by the whole Indigo infrastructure: it's the first real N-tier solution I've seen for Web Services that puts all the required pieces on the table, and it gives me a tingle in my toes that I haven't had since the first days of Transaction Server and the early releases of Java. The downside? Well, it relies on the Windows stack, obviously, but it's coming to XP ▶

▼ Read the new XML file formats guide to get the inside info on the new formats.



The Microsoft Office Open XML Formats New File Formats for 'Office 12'

White Paper

Published: June 2005

For the latest information, please see <http://www.microsoft.com/office/preview>

and Windows Server 2003 shortly, at least in beta. It also relies pretty much on the Visual Studio 2005 product suite and that hasn't shipped yet either, so there's a lot of future promise, otherwise known as 'jam tomorrow', in this announcement. However, I have no doubt Microsoft will be putting everything it's got into making it work – after all, it's betting the middle-tier farm on it.

APPLE ON INTEL

Another momentous announcement has just been made, but it's still too early to digest the size and scope of Apple's decision to move over to the Intel processor family. A few points need to be made clear from the start: Apple has been very clear that OS X will only run on its own Intel-powered hardware and not on any generic or third-party hardware platforms. To open up OS X to run on any old PC, which is entirely possible to do of course, would have been to declare open war on Microsoft, and Apple needs Microsoft

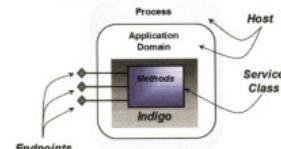
'Apple might want to open up the OS X software installation base to non-Apple, Intel-based machines.'

much more than Microsoft needs Apple at the moment, at least for the next year or two.

Once Apple rounds out its office application suite and has brought a few other items to market, it might want to open up the OS X software installation base to non-Apple, Intel-based machines, but for

Creating an Indigo Service

- As the figure below shows, every Indigo service is constructed from three things:
- a service class, implemented in C# or VB.NET or another CLR-based language, that implements one or more methods;
 - a host environment—an application domain and process—in which the service runs;
 - one or more endpoints that allow clients to access the service.



Understanding Indigo requires grasping all of these concepts. This section describes each one, beginning with service classes.

Creating a Service Class

An Indigo service class is a class like any other, but it has a few additions. These additions allow the class's owner to define one or more contracts that this class implements. Indigo service class implements at least one service contract, which defines the operations this service exposes. A service class might also explicitly implement a data contract which defines the data operations conveyed. This section looks at both, beginning with service contracts.

Defining Service Contracts

Every Indigo service class implements methods for its clients to use. The creator of a service class determines which of its methods are exposed as client-callable operations (including methods that aren't intended for external consumption). Defining service contracts in code, working alongside web services in general—is largely a new idea for the .NET world. Indigo's creators needed to find a way to graft this idea onto the CLR and the programming languages built on it. Fortunately, the CLR's creators anticipated the need for extensions like this so they provided support for attributes. As such, as a developer, attributes are character strings, perhaps with associated properties, that can appear before a class definition, method definitions, and other code elements to indicate how they should be treated.

The `[ServiceContract]` attribute is used attributes for various things since its initial release. For example, to mark a method as a SOAP-callable web service in the Framework's ASMX technology, that method is preceded by the `WebService` attribute. Similarly, Enterprise Services uses the `TransactionScope` attribute to indicate that a method requires a transaction. Indigo applies this idea to services, defining a range of attributes to define and control services.

The most fundamental attribute in Indigo is `ServiceBehavior`. In fact, an Indigo service class is just a class that is either itself marked with the `ServiceBehavior` attribute or that implements an interface marked with this attribute. Here's a simple C# example that uses the first approach:

▲ Indigo, Microsoft's new middle-tier strategy, looks to replace all existing communications channels between a client application and a server application.

the moment it isn't doing that. And while there's no real reason why you can't run Windows on an Apple/Intel box, I can't see anyone doing that, as it would be faintly silly.

Apple has timed the announcement just right, when OS X 10.4.x is up and running and feels complete and practical as a solution. The PowerPC G5 line is hitting headroom problems on scaling up in speed, hence the unavailability of a 3GHz PowerPC machine today. And the G4 is used mostly in the lower-end products, but critically also in the laptop marketplace where Apple is starting to trail badly behind Centrino- and Pentium M-based machines.

It made me smile when Steve Jobs announced that they'd been doing frequent builds of OS X on Intel, but just hadn't told anyone about it – it clearly shows that the NeXT heritage is alive and well inside Apple, which is a good thing. I've already ordered the \$999 developer kit, which comes with a PC on which to run the code. More news on this when it arrives in the next few weeks, in time for next month's column.

My hunch is that Jobs is being a little economical with the timescales for the availability of production hardware. I expect to see the first hardware in the shops in time for the next WWDC conference next January. There will then probably be a push to get everything over to Intel within one

year, rather than the two he has claimed. Apple will need. After all, by saying nothing will start to change until next year at the earliest, he's hoping that the sales of G4/G5-based product won't collapse. In the meantime, if the 10.4.x Intel build is as good as it should be, there's little reason not to get ready to ship hardware sooner rather than later.

Will the strategy work? It should. With the technology of 'fat binaries', you'll neither know nor care what processor is inside the box. Just load the application and run it. From that point of view, there's little point getting all excited about the end of the PowerPC line – Apple will continue to support this hardware for years to come. Should you wait for Intel boxes before buying an Apple computer? No way – there's great stuff in here to enjoy in the meantime. Just see how OS X 10.4 spans Windows XP Home's bottom – it just shows how much work Microsoft has to do for the home version of Longhorn.

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Apple to Use Intel Microprocessors Beginning in 2006

WWDC 2005, SAN FRANCISCO - June 1, 2005 - As Microsoft Corporation and Apple Computer announced their intent to make most of the Macintosh® computers using Intel® microprocessors by the end of 2007, Apple presented a vision of the future of computing. The company outlined its plans to move to an Intel-based Mac to the over 1,000 developers attending CEO Day, and announced its intent to move the Macintosh® to a new generation of Intel® Core™ processors. Core™ is a trademark of Intel Corporation. © 2005 Apple Computer, Inc. All rights reserved. Apple and the Apple logo are registered trademarks of Apple Computer, Inc. Intel and the Intel logo are registered trademarks of Intel Corporation. All other trademarks and service marks are the property of their respective owners.

Our goal is to provide our customers with the best personal computing experience in the world, and looking where that will have the most impact, we believe Intel is the right choice. We've been 10 years since our transition to the PowerPC, and we don't need to go through that again to create the best personal computers for the next 10 years.

We are thrilled to have the world's most innovative processor manufacturer as a partner. We are excited to work with Intel to bring the Macintosh to the next level. We have a long history of innovation and leadership in the industry, and we look forward to providing advanced chip technologies, and to continuing to lead the way in creating the best personal computing experience for years to come.

We plan to release future versions of Microsoft Office for the Mac that will run on Intel processors. We are also working with the creative manager of Microsoft's Macintosh Business Unit. "We have a strong relationship with Microsoft, and we are committed to continue our long tradition of making great applications for a great platform."

You don't have to make many moves on Apple's part and plan to create future versions of our Creative Suite for Macintosh that will run on Intel processors... and Intel Chosen CEO of the Month

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CHANGE FOR THE BETTER

Leigh Dyer looks at the latest developments in emulation, project management and SATA.

Very little in the world of computing, and Linux in particular, stays still for very long, so quite a few of the topics I've covered previously have been subject to new projects or other exciting new developments. This month, instead of exploring a single topic in depth, I'll take another look at those recent topics that are still rocketing along at breakneck speeds.

QEMU

I'm still a big fan of QEMU, the PC emulator I first looked at back in August last year. Back then, QEMU emulated a simple PC with ISA networking and VGA video, and while it was a lot faster than the age-old Bochs PC emulator,

called KQEMU, which is closed-source but free to use.

QEMU has some other neat tricks up its sleeve too, like a PowerPC emulator that's not too far off running Mac OS X, and an AMD64 emulator for running 64-bit operating systems. On an AMD64 host system, KQEMU supports CPU virtualisation in the AMD64 emulator, which must make QEMU one of the world's first AMD64 virtualisers. The AMD64 emulator still needs a bit of work though: many 32-bit OSs don't run fully yet, even though an AMD64 system should have no problem with them, and Windows x64 fails to run due to missing ACPI support. Hopefully this will all be fixed up before we next revisit it.

'Very little in the world of computing, and Linux in particular, stays still for very long...'

it still had some ground to cover before becoming a VMware rival.

QEMU's software-emulated PC uses PCI by default, with virtual PCI networking and IDE hardware. The VGA video is replaced by a Cirrus Logic GD5446 PCI video card, which isn't cutting edge, but it's still capable of decent resolutions. With all this widely-supported plug-and-play hardware, and a seamless networking mode that avoids setting up TUN devices, installing a guest OS takes virtually no configuration.

Perhaps more impressive though is QEMU's performance. To aid performance, QEMU has adopted virtualisation techniques similar to VMware, pushing its CPU performance to within a few percent of the host system for CPU-bound tasks.

The virtualisation mode needs a kernel module,

▼ QEMU's AMD64 emulator already boots 64-bit Linux.

```
BF-BEagle v1.00-pre10 (Debian 20040623-1) Built-in shell (ash)
Enter 'help' for a list of built-in commands.

# cat /proc/cpuinfo
processor       : 0
vendor_id      : AuthenticAMD
cpu family    : 5
model          : 2
model name    : QEMU Virtual CPU version 0.7.1
stepping       : 3
cpu MHz       : 1000.000
cpu max MHz   : 1000.000
cpu cur MHz   : 512.80
cpu features   : yes
cpu exception : yes
cpu id level  : 2
cpu revision  : 0
cpu cores     : 1
cpu apicid    : 0
cpu�flush mxr : fpu dau tsc msr par mce cx8 apic sep mtrr pge nmi cmov pat
cpu�flush mxr user msr scuzeall in
busoznops     : 3112.96
TLE # size    : 1536 48 pages
TLE # size    : 1536 48 pages
cache_alignment: 64
address sizes : 40 bits physical, 40 bits virtual
power management:

# uname -a
Linux (none) 2.6.10-11-and64-generic #1 Wed May 4 20:03:43 UTC 2005 x86_64 unknown
#
```

```
./configure --target-list=i386-
softmmu
make
sudo make install
```

You don't need to do anything special here to get KQEMU to build – if the QEMU configure script finds the kqemu folder, and your kernel development headers (make sure you've got these installed), and that they match your running kernel, it'll automatically enable the KQEMU build. You'll just have to make sure the KQEMU module is loaded before running QEMU:



▲ QEMU runs Windows XP at quite a usable pace.

```
sudo modprobe kqemu
```

Starting QEMU is much the same as it always has been. Here's how I run my existing Windows XP image:

```
qemu -hda winxp.img
```

QEMU now defaults to using 128MB of RAM in the virtual machine, so I don't bother specifying that any more. If you're installing a new system, building disk images is easier now thanks to the including of the qemu-img tool. You can then boot QEMU up with your fresh disk image and the ISO image for the Windows CD to run through the Windows installer:

```
qemu-img create winxp.img 2G
qemu -hda winxp.img -cdrom winxp.iso -boot d
```

I've used Windows XP here, but I think 2000 is the best choice, with better performance than XP. Unfortunately, there's a long-standing bug in QEMU that trips up the Windows 2000 installer. You can enable a workaround by giving QEMU the '-win2k-hack' option. This degrades performance a bit, but it's only needed while running the installer.

With QEMU's new PCI hardware, everything in your PC should be detected by the Windows installer, giving you immediate access to nice usable video resolutions. The networking is a snap too; QEMU now emulates a virtual network using a technique called SLIRP to shuttle packets through the host system. What this means is that no configuration is needed on the host, and the guest is automatically configured using DHCP. You should literally be able to fire up IE and start browsing the web as soon as Windows is installed.

With KQEMU under the hood, QEMU really is a joy to use, executing most code only a few percent slower than the underlying hardware. This gives QEMU a large and much welcomed speed



▲ Trac goes far beyond just Subversion browsing.

boost, bringing it much closer to VMWare's level of performance. It's still not quite there though, since few tasks are purely CPU-intensive (well, beyond CPU benchmarks).

The virtual hard drive and video card are probably the biggest bottlenecks; applications start slower than they would naturally, and the GUI can still feel a bit sluggish at times. The network card emulation is still limited to a simple 10Mbps affair as well. However, with the massive strides QEMU has taken so far, I'm sure these areas will improve in future as well.

SUBVERSION'S NEW BEST FRIEND

I looked at Subversion, a rather nice version control system, just a few months ago in July. Version control systems store projects, whether they be the source code to an application, the pages and images of a website, or anything else you might think of, with a complete version history. This not only lets you keep track of what's changed over the lifetime of a project, but it lets you rewind time and get a snapshot of things as they were at any point.

Subversion's a lot more fun when you've got a nice web interface to browse your repository with, and in the last article I looked at a nice, simple offering called WebSVN. Since then though I've discovered Trac (www.edgewall.org/trac/), a project that combines Subversion browsing with a ticketing and change management system and a

▼ The Trac Timeline provides a comprehensive overview of your project's history.



wiki. This lets you keep just about every piece of information about a project, from the project files themselves through to change requests and documentation, in a single interface.

Trac is written in Python, and has a few dependencies, including Subversion (of course) and its Python bindings, and a HTML template system called Clearsilver. However, it's packaged in Debian, so you can install it with a simple 'apt-get install trac'; other distributions will likely have packages as well.

Once it's installed, you'll need to create a Trac environment to match your Subversion repository, using the trac-admin command:

```
trac-admin tracsuite initenv
```

The initenv command tells trac-admin to create a new Trac environment. It asks a few questions, such as the name to use for the project, and the location of your Subversion repository. Once you're done, you can start Trac using its embedded webserver:

```
tracd -p 10000 tracsuite
```

Open <http://localhost:10000/tracsuite/> in your browser, and the Trac interface should appear, starting with the default front page. The front page is stored as part of the wiki, so you can customise it (or any other wiki page) by clicking on the Edit This Page button at the bottom. The Subversion browser is under the Browse Source tab. It's much like WebSVN, letting you browse through and look at your files, and display the changes in their most recent versions.

You can create a new ticket using the New Ticket link. If you haven't used a bugtracker or other issue tracking tool before, the basic idea is that issues such as bugs, feature requests, support queries, or other problems, are entered in to a central system. People working on the project can look through the issues, and take on the items relevant to them. Much like a version control system, the issue tracking maintains a full edit history for each ticket.

Trac's true power soon becomes apparent when you check the Timeline tab. The Timeline lists not just Subversion change sets, but wiki edits and ticket changes as well. This gives you a great overview of the activity going on in your project. For instance, if you received a bug report, you could enter a ticket for the bug, fix the bug and commit the changes to Subversion, and then close the ticket to mark the bug as being fixed. The Timeline view shows all of these events in chronological order, so you can easily see precisely which Subversion change set fixed the bug.

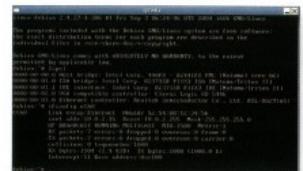
Wiki integration permeates Trac as well. For instance, if you use wiki words in a ticket, or even in a Subversion commit message, they're automatically converted to links into your wiki. There are some other nice touches along these lines as well; if you're committing a change that relates to a specific ticket number, you can put the ticket number in to the commit message, and that text becomes a link to the ticket when viewed in the Timeline.

Trac's little embedded web server works quite well, but for a permanent install it's a good idea to get it running under Apache. Check the TracGuide wiki page for more information.

SMART SATA

In another recent piece I looked at serial ATA support under Linux, but only briefly, since all recent distributions handle SATA with ease. However, there's one handy feature missing at the moment: SMART support.

SMART is a feature that IDE drives adopted quite a while ago to allow various kinds of status and error reporting. Through SMART, and a handy app called hddtemp (www.guzu.net/linux/hddtemp.php), you can keep tabs on the internal temperature of your drives. It's perhaps only a neat



▲ QEMU's new autoconfiguring networking code is fantastic.

curiosity for home systems, but for servers, this kind of monitoring can come in very handy.

SMART support in Linux is part the IDE layer, but SATA support comes through the new Linux ATA infrastructure, called libata, which actually sits under the SCSI layer. However, the development version of libata has SMART passthrough support.

The official way to get libata-dev is through the new Linux kernel version control system, called "git". I honestly haven't had the time or inclination to work that out yet though, so for now, I'm sticking to the patches made available periodically at www.kernel.org/pub/linux/kernel/people/jgarzik/. Patch up your kernel, rebuild, install, and reboot, and you should be ready to go.

Leigh Dyer
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BURNING QUESTION

Brian Heywood finds a robot to help him with the time-consuming task of producing multiple copies of a CD.

Back in the mid-1990s, when I bought my first CD recorder – A Yamaha CDE 100 connected to my SADIE audio editor – it cost something closer to \$1200 than \$200, and the price of blank media was coming down to around \$25 per disc. Fast-forward ten years and the costs have changed: I paid a princely \$40 for a CD-R drive a few weeks ago and blank CD-R media costs less than 30¢ a disc in bulk.

One thing that hasn't changed over the years, though, is that as soon as you need to make multiple copies of a CD it starts to chew up an unreasonable amount of your time. Admittedly, writing speeds have increased dramatically from the original 1x or 2x drives, but you still can't get on with another task while you wait for a disc 'burn' to complete. Basically, you become the servant of the computer rather than its master, feeding it fresh discs, testing and labelling the completed ones and so on.

However, I recently came across Primera Disc Publisher, a device that promised to solve my 'short-run' CD production problem. It's essentially a dedicated robotic arm integrated with a CD (or DVD) burner, an inkjet CD printer and two bins for holding blank and completed CD-R media. The idea is pretty simple: the robot arm picks up a CD-R blank, pops it into the burner, retrieves it once the burn is complete, stuffs it into the printer and finally dumps it into the finished pile after your own full-colour design has been printed onto it. Any discs that fail at burn are rejected before printing. This verification process also means you can have a pretty high level of confidence in the finished products.

The system I've been using is the smallest of the units in the range and is called the Disc Publisher II. It's designed to handle up to 25 discs at a time, although you can do a run of 50 if you use it in its 'kiosk' mode. There are also larger units in the Primera range that can handle 50, 100 or 400 discs depending on the operational mode. All systems

▼ **Primera Disc Publisher II** can automatically duplicate and print up to 50 CD-Rs at a time.



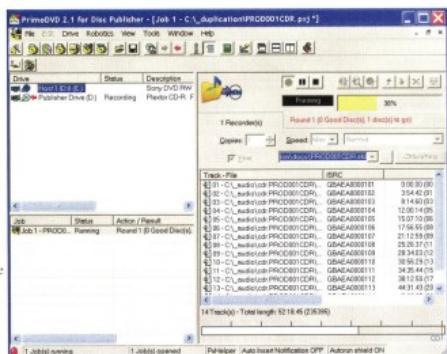
come in either CD-only versions or with a DVD/CD combo drive, and the one I've been using is the CD-only variant.

In operation, the robot arm picks up a blank CD from the input hopper and places it onto the open tray of the CD burner; the disc is then programmed, whereupon it's picked up a second time and placed onto the CD printer tray. While the first disc is being printed, the robot arm returns to pick up a second disc for programming, which increases throughput by performing the two processes in parallel. In normal mode, the disc gets placed in the output hopper once it's complete, while duff discs are ejected via a reject chute. In kiosk mode, both hoppers are filled with blank discs and all the finished CDs, both good and faulty, come down the chute.

THE GHOST IN THE MACHINE

The software that comes bundled with the unit is pretty straightforward, which is just as well as little documentation is included, either in the form of paper manuals or in usable electronic format. The main application is called PrimoDVD and is a somewhat clunky-looking CD/DVD authoring package that nevertheless has the wherewithal to control Disc Publisher's cybernetics. You also get a cut-down version of Sure Thing CD/DVD Labeler software, which I almost immediately upgraded online to the Deluxe Version for just over a tenner. This program worked well for me, as I already used an older version of the software to generate labels from my Neato CD Labeler kit and so didn't have to start redesigning my labels.

The software lets you generate the CD/DVD from its constituent files, or else create a disc image from an existing CD. When creating an 'audio' job, you can define an ISRC (International Standard Recording Code) for each track, CD Text and a UPC/EAN barcode, which means that the discs are suitable for commercial release. You can also produce a CD Extra or Enhanced CD, which combines audio and data on the same disc, in a format that's suitable for playing on domestic hi-fi CD players without any risk of destroying the speakers. To be frank, this process is a bit awkward, since you have to do it in two separate passes, so you have to make sure there's enough space on the CD for both sessions. I'd personally rather



▲ The bundled software allows you to define a job in a number of ways, from the components, a master disc or a prepared Global Image.

use some other package like Steinberg's WaveLab or Roxio's Easy CD Creator to create a master and then copy it, but the built-in software would be OK if you didn't need this facility often. In addition to audio and data (CD-ROM) formats, you can create VideoCD as long as you have suitable MPEG1 video files in a suitable format, which is useful since most decent DVD machines can play these nowadays and it offers you a cheap 'fast-track' to a wider audience.

You can create a 'global image' from any type of CD the reader will handle, so, for instance, you can duplicate a master disc created on some other mastering system like a Mac HFS CD-ROM. Alternatively, you can use this feature to produce additional copies from a previous release – useful as a stopgap between production runs. An interesting variation on this theme is the 'stream mode', which allows you to do an ad hoc copy of a series of CDs – say, backup copies or a small distribution release. The idea is that you place a stack of CDs in the input hopper, which consists of your master disc(s) followed by the number of CD-R blanks corresponding to the number of copies you want produced. The software will then create a temporary image of the first disc then continue to burn copies of this until the next master reaches the top of the pile. This process will be repeated as each new master is encountered, until the pile of discs is exhausted. You have to forgo the printing stage, as there's no way to associate a different image with each new master, but at least you don't have to sit in front of your PC feeding it discs.



▲ The 'robot arm' can move up and down its fixed rail to access the two CD hoppers, the drive and printer.

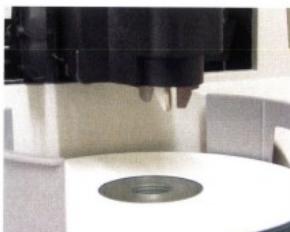
As well as normal 120mm CDs, the system will handle CD-singles (80mm) and the two most common business card formats (saddle and oblong) if you buy the optional media adaptor. This is made up of a set of different-shaped bins for holding these smaller CD blanks and an adaptor for the printer tray. For some reason, the software is unable to burn and print the smaller format discs in parallel, so you need to pass all the discs through the machine twice: once to burn and a second time to print.

TIME, GENTLEMEN, PLEASE

One thing you do need to be aware of is that producing discs using this machine isn't necessarily going to be any quicker in absolute time than doing the process by hand; in fact, I found that throughput on the unit I have – albeit connected to the PC via a relatively slow USB 1.2 connection – was somewhat slower than my normal system. The point though is that you aren't tied up for all this time. Once a burn/print run has been set up, you can wander off and get on with other work or play, then come back later to collect the finished products (and by examining the log you can see if there were any problems).

Blank media may be purchased directly

▼ Powerline network interfaces – the ultimate in 'plug and play'?



▲ Using optical and touch sensors, the grabber can pick up a single CD off the top of the pile.

from Primera in Germany, but any guaranteed inkjet-printable blank CD-Rs should work. I tried it with a variety of media types that I use in my studio, with good results. The printing hardware seems to be based on a HP Deskjet engine, although Primera says it uses a specially formulated ink optimised for CD printing. The finished product isn't so robust as a commercially duplicated CD, because the ink is water-soluble, but the resolution is much higher than the usual silk-screen process you get on a CD from the pressing plant, so it's swings and roundabouts.

One thing you need to consider before plumping for this type of duplication machinery



▲ The CD is placed on the tray of the CD-R drive. This is repeated to place the CD into the printer tray at the end of the burn.

medium outweighs the fact that it's less robust, and be sure that you make this difference clear to your client or customer.

POWER NETWORKING

Something I neglected when I designed my new basement studio in 1993 was to include any networking facilities. I did this in part because I wanted to keep the studio and office computer systems apart, and partly to avoid the hassles that extensive networks inevitably bring into your life. However, a decade later, I came to realise that the benefits far outweigh the risks and began rather to regret the decision. This meant that I added an

'It's essentially a dedicated robot arm integrated with a CD (or DVD) burner, an inkjet CD printer and two bins for holding blank and completed CD-R media.'

is the reliability of the CD-R as a storage medium or as a delivery format for commercial music. CDs manufactured at a pressing plant are more reliable, since they have physical 'pits' to encode the data, whereas CD-R, on the other hand, relies on diffracting the reading laser's light beam from a plastic lens formed within the structure of the CD by localised heating of the dye layer. The lenses get created by the organic dye, absorbing energy from the relatively powerful programming laser, which delivers 5–12MW as opposed to the 0.5MW reading laser. The bottom line is that the reflectivity difference between programmed and unprogrammed 'bits' is considerably less than on a pressed CD, which is one reason why older CD players often won't play CD-R discs.

The media are also much more fragile and can be damaged both by physical abuse and by high temperatures, since the programming is essentially a thermal process. I have data backup CD-Rs from 1995 that are still error free, but they've been stored in a cool, dark place. I'd never leave a CD-R exposed to direct sunlight or stored in a hot place for a long time, as this might well adversely affect reliability. Put simply, you need to decide whether the convenience of using the CD-R

item to my list of 'things to do'; namely, to run a network cable from my office upstairs to the studio. However, since this would involve ripping up the floor and drilling through walls, the item stayed firmly on the list for a long time.

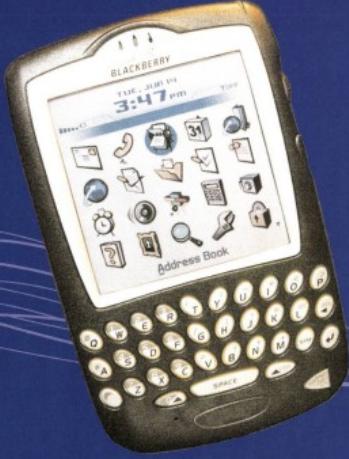
In fact, it stayed there until I came across a powerline Ethernet adaptor, which uses your mains wiring as a sort of giant aerial to carry Ethernet traffic. The units communicate with each other at data rates up to 14Mb/s, and there's a theoretical limit of 253 devices on one circuit, although it isn't recommended in practice to have more than ten or so. The actual data rate between units will depend on the physical configuration – and, perhaps, the quality – of your mains wiring.

They turned out to be extremely easy to use, with no configuration required at all. I have three units currently in use, two connected via mini-hubs and one directly to a computer, and their data rates vary between 4Mb/s and 14Mb/s, which is fine for accessing the shared Internet connection and transferring files across the network. I can now transfer finished audio masters from the studio directly to my CD-duplication PC, audition and download sound-effects files in the middle of a recording session and so on. Running Ethernet over power cables has no effect on audio gear, and I haven't had to rewire anything, happy with that! ■



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WIRELESS ROUTERS

Are wireless terms a bigger jumble than the cords behind your PC? **Nick Ross** cuts the wire.

802.11a

A corporate rival to 802.11b/g – offering 54Mb/s transfer speeds on the 5GHz frequency band. Products are more expensive and less popular than 802.11b/g.

802.11b

The first popular consumer wireless standard. It works on the 2.4GHz spectrum and offers maximum transfer speeds of 11Mb/s.

802.11g

The update to 802.11b. Offers a maximum theoretical speed of 54Mb/s but is backwards compatible to 802.11b.

802.11n

The next wireless standard – expected in a year or so. MIMO will be part of this but details are far from finalised.

ADSL modem router

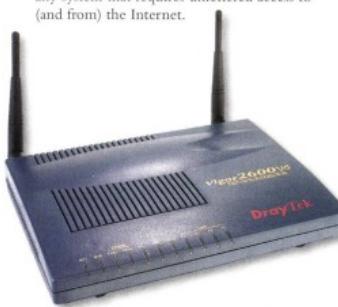
These differ to Ethernet WAN routers in that they don't need an external modem – they plug straight in to your phone line via a standard RJ-11 connector. What most people need to share their broadband.

Application filtering

A feature of some routers that lets you set restrictions on the type of application that can pass through it.

DMZ [demilitarised zone]

If a router is set to forbid users from visiting certain websites or using certain applications, you'll normally be able to set up at least one computer without such restrictions. This special area is called the DMZ, and is used for any system that requires unfettered access to (and from) the Internet.



▲ Draytek's router offers great features like VPN tunnelling and VOIP.

Ethernet WAN

Routers usually have four Ethernet ports for LAN connections plus one which connects to the Internet via a broadband modem, or an existing network – the Ethernet WAN port. Routers that have this option are often termed gateway routers.

MAC (Machine Address Code)

Every device that can connect to a network has its own unique MAC address (identification code). This lets a network know which hardware is attached to it, and filter access based on specific MAC addresses. Some ISPs lock access to the MAC address that was supplied to the subscriber, however some routers allow you to 'clone' the MAC address of your original hardware, thereby fooling your ISP into allowing alternative hardware to gain access. A router can then pretend to be the modem allowing you to share an Internet connection.

MIMO (Multiple In Multiple Out)

A MIMO router uses at least three antennas to broadcast and receive wireless radio signals. The antennas constantly survey your home or office for physical barriers like walls, radiators and interference and adjust the wireless signal to compensate for these performance inhibitors. When used with a matching client adapter it can double the transfer rate of a network. It will also theoretically double the range of traditional 802.11g networks.

QoS (Quality of Service)

All Internet data is divided into packets, including your voice in a VOIP phone call. These packets can be routed over the Internet in different ways and arrive at different times. This is fine for ordinary data, but voice calls need to arrive in a steady, synchronised stream to avoid garbled or delayed speech. QoS protocols ensure 'real time' packets are prioritised over data.

SPI firewall [Stateful Packet Inspection]

Only Internet data packets that are expected are let through a SPI firewall. If a packet is sent without stating its business, it's sent packing. It's a great barrier against hackers and all routers have them these days.

SSID (Secure Set Identifier)

The name of a wireless network. Routers can be set not to broadcast it making it trickier for strangers to know a network is there.



▲ Linksys' router uses three antennas in a MIMO configuration. And it looks a bit like a landmine.

VoIP (Voice over Internet Protocol)

The system which lets you make telephone calls over the Internet.

VPN (Virtual Private Network)

A secure way of accessing a remote computer or network through a virtual tunnel across the Internet. Most routers allow VPN tunnels to pass through them only, but more expensive models like those from Draytek (In this month's router Labs, page 95) allow you to set them up too.

WDS Wireless Bridge [Wireless Distribution System]

Some routers can use WDS to expand wireless coverage. They act like a bridge on a network – picking up the signal from another client and simply repeating it.

WEP (Wired Equivalent Privacy)

A fast-aging method to secure wireless traffic. It's less secure than recent protocols like WPA, and will slow down your connection.

Wireless router

A router automatically directs network traffic from one computer to another usually using Ethernet cables. A wireless router simply adds a wireless connection too. Most people use wireless routers to beam their broadband connection around their home or office.

WPA (Wi-Fi Protected Access)

A far improved version of WEP. WPA encryption secures your wireless data. You can simply set up a password to grant access or, in the case of large corporate offices, highly-secure RADIUS servers. The performance hit is minimal in relation to WEP.



GAME LABS

It's a month of gaming bigger than King Kong. Look no further for your racing, flying, shooting, Earth-saving action, with Ben Mansill.

BYTES



MONKEY MADNESS

PC Authority's favourite monkey, King Kong, is coming to a screen near you in Peter Jackson's remake of the classic remake of the classic. It's also coming to a PC screen in Ubisoft's Peter Jackson's King Kong on 17 November, a full month before the movie opens.

We hope that the game doesn't spoil the movie by revealing too much of the story, or even the ending, when Kong dies.



Saitek X52

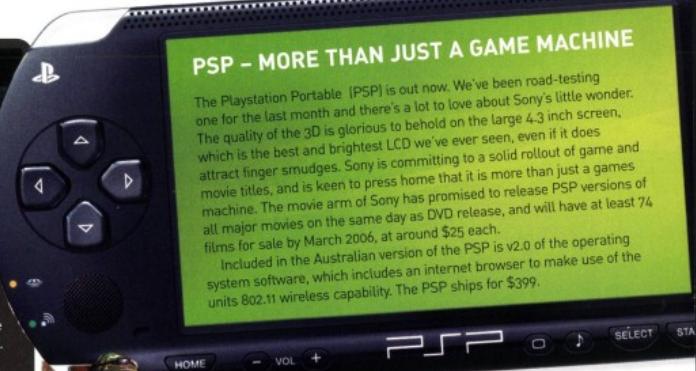
PRICE: \$199.95

It's 200 dollars and worth every shiny cent. Saitek's new top of the line X52 joystick and throttle will serve your flight and space sim needs like a dream. It's an ergonomic marvel to lay hands upon, the throttle especially wonderful to rest your hand on and spin the engines up to maximum we-are-leaving power. The joystick's movement is soft, smooth and luscious. It's inlaid with shiny steel and rubber, has a glowing blue LCD display and bright blue LEDs absolutely everywhere. In a dark room it looks wondrous. Best. Toy. Ever.

SUPERLATIVE: Home Entertainment

INTERNET: www.hes.com

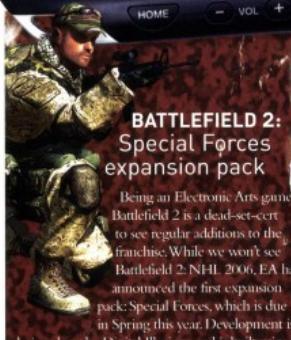
OVERALL: ★★★★★



PSP - MORE THAN JUST A GAME MACHINE

The Playstation Portable (PSP) is out now. We've been road-testing one for the last month and there's a lot to love about Sony's little wonder. The quality of the 3D is glorious to behold on the large 4.3 inch screen, which is the best and brightest LCD we've ever seen, even if it does attract finger smudges. Sony is committing to a solid rollout of game and movie titles, and is keen to press home that it is more than just a games machine. The movie arm of Sony has promised to release PSP versions of all major movies on the same day as DVD release, and will have at least 74 films for sale by March 2006, at around \$25 each.

Included in the Australian version of the PSP is v2.0 of the operating system software, which includes an internet browser to make use of the units 802.11 wireless capability. The PSP ships for \$399.



BATTLEFIELD 2: Special Forces expansion pack

Being an Electronic Arts game, Battlefield 2 is a dead-set-cert to see regular additions to the franchise. While we won't see Battlefield 2-NHL 2006, EA has announced the first expansion pack: Special Forces, which is due in Spring this year. Development is being done by Digital Illusions and is built using the new Battlefield 2 engine. That means you'll need a DirectX 9.0 compatible video card to play it, a point of contention amongst the Battlefield community, but by the time Special Forces ship many gamers will have upgraded.

Special Forces' twist is that it offers 6 different sides to play for: Navy SEALs, British SAS, Russian Spetsnaz, MEC Special Forces, Rebel groups and Insurgents. Each will offer weapons unique to the force, and the game settings will be appropriate to the nature of Spec-ops missions.

Also promised is 10 new vehicles, generous indeed for an expansion pack. We're expecting a healthy arsenal of gadgets too, another Spec-ops hallmark. The bonus is that by the time it ships, the appealing but imperfect Battlefield 2 engine should be patched to perfection.

THE BIG WORLD OF WARCRAFT

Blizzard's World of Warcraft continues to surge into the record books. The Massive Multiplayer Online Role Playing Game (MMORPG) has truly broken through to the mainstream, a first for a genre traditionally inhabited solely by 'hardcore enthusiasts'. This is not a game dominated solely by sleepless geeks! When was the last time you saw TV ads for a MMORPG. That's right – never. With over 3.5 million paying subscribers already, Blizzard has been in a constant battle to keep upgrading its server capacity.

Now, in a remarkable new chapter in the tale, the game has gone onsite in China and in its first month has sold an astonishing 1.5 million copies! PCA hopes that these gamers are enjoying the game for all the right reasons. Recently a World of Warcraft scandal raged whereupon Chinese students were paid to build up World of Warcraft characters to high levels, which were then sold on eBay.



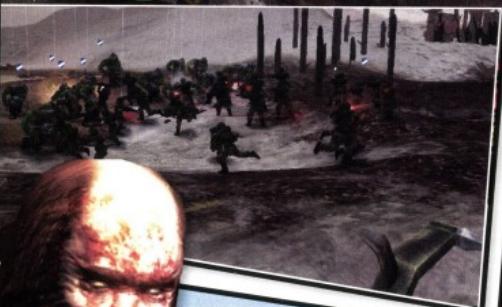
WARHAMMER 40K: Dawn of War – Winter Assault

FROM: THQ WHEN: September WEB: www.dawnofwargame.com

Warhammer 40K: Dawn of War caused a stir last year with its simplified action-oriented approach to real-time strategy. It was also perhaps the most successful transition of the Warhammer 40K Space Marine universe into a PC game.

The expansion pack, Warhammer 40K: Dawn of War – Winter Assault, adds a new race, the Imperial Guard. These guys don't have the hardware of the Space Marines but instead get by through strength in numbers. The addition of the Imperial Guard promises to add a new dimension to multiplayer skirmishes by allowing a more defensive style of gameplay.

The original Dawn of War single player campaign only allowed you to play through as the Space Marines, thankfully it looks like Winter Assault will allow you to choose between the Imperial Guard and the Orcs. This is definitely a title for Warhammer fans to keep an eye on.



GT LEGENDS

FROM: SimBin WHEN: October WEB: www.gt-legends.com

Imagine a hardcore racing sim based upon up to 90 classic cars of the 1960s and 70s, such as the Ford Capri, De Tommaso Pantera, Porsche 911 Turbo 'whale-tail' and the original Mini Cooper S. You know, really cool cars. Now imagine a career mode not unlike Gran Turismo or Forza, where you buy and sell cars as you progress. Then imagine that each car has driving physics which are so realistic it takes days to learn how to drive a car to its limit. Last, before you blink, imagine that it supports online racing done right.

Imagine no more, it's real. It is GT Legends, and it comes from SimBin, the same team that astounded us with the incredible GTR (awarded a perfect score in August 2005). Car buffs, serious racers and simulation fans all have much to look forward to, so mark October down in your calendar. At the time of writing no Australian distributor has been announced, but we'll keep you posted when we get this sucker in for review.



GUN

FROM: Activision WHEN: Christmas

Like Donny and Marie Osmond, Gun is a little bit country, and a little bit rock 'n' roll. The 3rd-person action adventure game is set in a familiar cowboy and Indians theme, but features a gritty hard edge that probably won't earn it a G rating. Adult themes run rich in gun: sex, violence, and blood drive much of this story.

Activision's famed Neversoft studio has been working in secret on Gun for the last two years, and despite intense industry speculation, the secret remained well hidden. Activision has high hopes that Gun will be an ongoing franchise and it has worked hard to ensure the first game has a big impact.

The storyline follows the adventures of Colton Wright as he quests to discover his true identity. Gameplay is similar to the free-ranging Grand Theft Auto style, with a mess of sub-quests to play as the main storyline develops. No cliché is left untouched, from bar-room brawls, little burlesque houses, and wagon trains besieged by Indians. Neversoft hasn't let us down yet, so we'll be watching Gun closely.



F.E.A.R.

Monolith has a reputation for (but hasn't been restricted to) almost cartoon-like action worlds, such as *No One Lives Forever 2*, *Trot 2.0* and *Shogo*. But with *F.E.A.R.*, the fun is over. This new game world is harshly real, and while some gaming clichés have been embraced, there is refreshing originality in *F.E.A.R.*.

You play a Special Forces grunt fighting for the *F.E.A.R.* bad boys, whose M.O. and acronym is First Encounter Assault and Recon. You don't have a name or persona beyond your soldier character and this actually serves to draw you deeper into the game – it really is you playing, not some contrived tough guy making smart alec comments.

Nameless, your journey begins as you take up the fight against a clone army (hello George Lucas). While this original premise is formulaic, it serves to highlight the astounding AI in *F.E.A.R.*. These hombes employ fighting tactics more akin to real people in a deathmatch, than computer controlled bots. They will fight with convincing intelligence, providing covering fire for each other, working as a team to out-flank you, with squad leaders yelling orders to each other during a firefight. Living up to its name, the advanced AI is scarily real in places, forcing you to think your way out of gunfights. During our test play, we had a group of clones cornered in an office, when to our shock one jumped clear through a window, vaulted over a desk then pulled a bookcase down to use as cover. We threw a grenade behind him – so he crawled under a gap in the bookcase and ran for cover across the other side of the room!

'...when a gunfight ends and the ceiling turns into an up-side-down sea of blood with a young girl walking through it, singing, something isn't right.'

This is challenging and exhilarating gaming at its finest, but it's not all full-bore action. The pace is relieved with bizarre paranormal sequences. We're not going to give too much away, but when a gunfight ends and the ceiling turns into an up-side-down sea of blood with a young girl walking through it, singing, something isn't right.

Capping off the checklist is an all-new and truly beautiful graphics engine. It makes extensive use of particle effects and volumetric lighting. During a battle stray rounds will blow out holes in the brickwork, that we've seen before, but the clouds of cement dust will quickly fill the room, obscuring your line of sight – misplaced bullets can thus work for or against you. *F.E.A.R.* also implements a form of bullet-time, which charges up for use when it's all getting too much, and when you want to enjoy the explosions in all their slow motion glory.

F.E.A.R. has us curious and excited, it promises fresh and exciting gameplay with dazzling graphics. If it delivers on its promise, Christmas gaming will be frightfully happy indeed.

Ben Mansill

DEVELOPER Monolith Games

PUBLISHER Vivendi Universal

WHEN Spring 2005

PREVIEW





Get lost in the demonic chapters of Fable

Sword swinging, spells and Summoners.

It must be Lionhead's latest epic on PC...

Not long ago, in the sacred pages of this very magazine, a game known as Fable boldly appeared. Atomic proclaimed it "a truly delightful game", scored it 9.5/10 and deemed it worthy of the hot award. Now, Lionhead are busy writing the next page of the Fable tale. Fable: The Lost Chapters is set for release on PC this October, bringing the joys of Albion to a whole new breed of gamers.

On top of the original's well-received role-playing innovations, satisfying combat and reactive world, Fable: The Lost Chapters extends and expands Albion, refining the game for the PC and adding a raft of new features. Make no mistake, this is the Fable that Molyneux always wanted to create.

The first iteration of Fable was celebrated for its revolutionary social gameplay, where Albion's inhabitants would respond intelligently to your achievements, appearance and

actions. Play the game and you'll love hearing the townsfolk call your name as you embark on another heroic quest, or take pleasure from them cowering in fear at first sight of you. Fable: The Lost Chapters adds new actions

The Lost Chapters is blessed with higher-resolution textures, improved character models and environments and supports 16x anti-aliasing.

and communications to your repertoire. Now, among a mass of new choices, gamers can do the chicken dance or play air guitar to wow the kids or perform the flamenco to woo the ladies.

Also, added to the original Fable are more new regions than you have fingers, taking the player closer to the secrets of Albion and its epic past. Players will be faced with monumental new foes like the Ice Troll and the Summoners, and new structures, like brothels! While the Ice Troll (pictured) will prove formidable, Albion's hairiest madams and pushiest pimps will bring with them their own challenges. Fortunately, you'll be given access to some spectacular new magic spells whichever side of the good or evil fence you fall, that will help you meet The Lost Chapters' new challenges.

The improvements are not simply game-play-based either. Lionhead has taken advantage of the capabilities of top-line PCs to ensure the game mixes it with the best avail-

able of PC shelves. Fable: The Lost Chapters is blessed with higher-resolution textures, improved character models and environments and supports 16x anti-aliasing. PC optimisation means that all extended loading times have been removed, keeping players seamlessly immersed in the Albion wonderland. Keyboard shortcuts and refined mouse-based precision control also grant the player freedom

to take advantage of their combative instincts.

More new features specifically designed for the PC include the Online Scoreboard and tattoo importation. Now players can compare themselves with fellow heroes or villains from around the world, or use their favourite image editor to make their unique mark on the game any self-respecting rock star would be proud of...

For more information visit www.microsoft.com/au/fable

Players: One
Developer: Lionhead Studios
Publisher: Microsoft
Release date: October



Not suitable for people under 15. Under 15s must be accompanied by a parent or adult guardian. Strong violence, sexual references



Dungeon Siege II

FOR

Lovely graphics; polished design; easy yet powerful gameplay mechanics.

AGAINST

Linear; formulaic; soulless; screen text almost unreadable at high res.

OVERALL

Were this game developed by a small independent house lacking resources, all we'd have to play is a bog-standard RPG with an almost embarrassingly formulaic storyline and near fatal flaws. Dungeon Siege II is indeed that, but it's made with Microsoft money, a sugar-coated mountain of it so high that it covers up the bad-bits and actually makes the game half-decent.

'Ultimately the point of it all is to bring together a lost magic sword and a lost magic shield, but the storyline is dull and uncompelling.'

Dungeon Siege II is claustrophobically linear. Just like its forebear. Your journey through the game world is one of one-way streets, mountain passes, jungle paths, desert canyons – any kind of terrain you can imagine which walls you in. It is a never-ending garden path from which you cannot veer. But thanks to the efforts of the development team and their budget, the

game world is supremely detailed and very beautiful to play in, and look at on your screen.

Gameplay is Diabloesque. Clickity click death upon the swarming hordes which lurk around every bend along the path. But Dungeon Siege II qualifies as an RPG, not an action-adventure because it has an intensely deep and convoluted power-up system. All part of the richly detailed world design ethos. Your strength and skills come from the gear you wear and carry, how you spend power-up points and the influence of others in your party, standard stuff. But the game world is festooned with funky ways to gain extra mettle, whether temporary, like Shrines which are placed just before major enemy locations, or different plants that give health or mana boosts.

targets you select or simply rampaging through the bad guys. Add to that a comprehensive spellbook that allows you to set certain spells for automatic casting in battle, very convenient indeed, and a function to collect every little treasure your enemies drop in combat, also handy dandy.

Ultimately the point of it all is to bring together a lost magic sword and a lost magic shield, but the storyline is dull and uncompelling. Completing secondary quests feels a little hollow, as you find that you inadvertently complete them while trucking along the primary path.

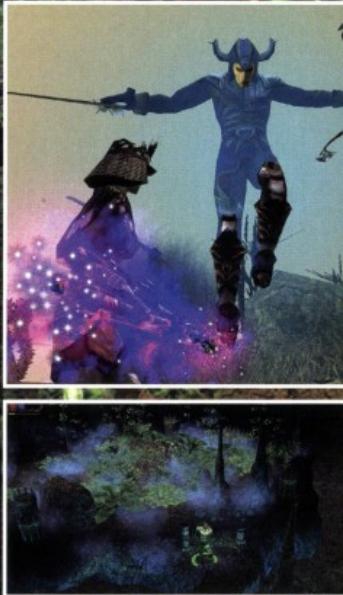
Still, there are enough carrots dangled through the game to keep you going and mostly having fun at it. Hardcore RPG players won't like it, but if you're new to the genre it's an excellent training wheels introduction.

REQUIREMENTS

1GHz CPU; 256MB graphics card; 2.8GB HDD.
SUPPLIER Microsoft

PRICE \$99.95 SMALL HEALTH POTIONS
www.microsoft.com/games/pc/dungeonsiege2

Balancing your party and using it effectively in combat is the most rewarding experience Dungeon Siege II offers. As the game progresses the size of your party grows, but even from the start with just two adventurers there's enough room for tactical decision-making to make it fun. Any of your group can be the primary character, you control, with the others attacking specific



WilliamsF1 Team Force Feedback Racing Wheel



PS2 Wireless Analog Soft Touch



Falcon 4.0: Allied Forces

FOR

Dynamic campaign world; ultra-realistic avionics and systems.

AGAINST

Some 1998-era legacy graphics peep through the cracks.

OVERALL



full of bugs, that sales were relatively poor and community disappointment was extreme. Shortly afterwards the company went under, but not before the source code for the game was 'leaked'. In reality, legend has it that passionate developers threw the source out to the community in the hope that fans would complete their opus. And they did. For years patches and mods flooded the sim world. So many, that it all became a tangled spaghetti of conflicting versions. Eventually Darwinian Theory came into play and the leading mod crafters banded together to form a company, and combine their forces to create the penultimate Falcon 4.0. Which they miraculously did, and we now have Falcon 4.0: Allied Forces, almost 15 years after development of Falcon 4.0 began.

In a genre abandoned by all but niche developers, Falcon 4.0 stands tall as the most complex and sophisticated combat flight sim ever made. Allied Forces has updated the graphics, but it's not the prettiest sim in town; that's not what it's about. The F-16 modelling is super-accurate and the game world intricate and deep. In campaign mode the battlefield rages on with or without you. In play, you really do feel like a tiny cog in a mighty wheel.

Here is a game born of the great vision of Spectrum Holobyte and evolved to perfection by the gaming community.

REQUIREMENTS

P4 2.4 or Athlon 1800+; DirectX 9.0 video card; 1.5GB HDD; quality joystick.

SUPPLIER:

Atari

PRICE: \$39.95

www.atari.com.au



▲ It took 15 years, but it was worth it.



▲ Cockpits are meticulously detailed.



▲ At height, the surroundings are lush.



REVIEWS | GAMELABS

Codename: Panzer Phase Two

FOR

Slick, fast-paced, RTS action; open-ended missions.

AGAINST

Not enough expansion on the original.

OVERALL



Stormregion's Codename: Panzers Phase One was a quiet achiever among the horde of WW2 RTS games. Its tactical focus harked back to one of PC Authority's favourite strategy series, Close Combat, but with more action-focused gameplay and tidy 3D graphics. It didn't break new ground, but it was one of the first to

successfully tie all the elements together in an engaging title with a surprising level of depth to WW2 purists.

As a tactical strategy game, Codename: Panzers follows a mission based format, played through single one-shot scenarios, or linked through a campaign. Dropping the resource management that's typical of the genre, Panzers puts you in command of a handful of infantry, armor and support in order to complete specific objectives. There are many ways to complete each mission, with every level filled with surprises and secrets – a frontal assault is always possible, but the open-ended maps encourage you to explore each level.

The graphics have been tweaked up from the original, but many won't notice. This is no oversight, as the original featured smooth animations, which easily scaled up and down depending on the size of the battle. This typifies Phase Two – aside from the North African setting, a handful of additions, and general cosmetic improvements, this is simply more of the same.

As the name implies, this is undoubtedly another phase rather than a full sequel. It treads the same path as its predecessor, improving the foundations already laid down, and wraps itself up in a healthy grab bag of campaigns and missions. It's an expansion by any other name, and for fans of the original, it'll be your wallet and fanaticism that will make it worth the full price of a new game. Newcomers to the series, on the other hand, can't go wrong.

REQUIREMENTS

750MHz CPU; 256MB RAM; 32MB graphics card; Win 98 onwards.

SUPPLIER:

QV Software

PRICE: \$89.95

www.panzers.com



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V8 Supercars 3

DEVELOPER: Codemasters **WHEN:** February 2006

WEB: www.codemasters.com

Talk about value! This game promises 35 different racing disciplines through 100+ individual championships. Codemasters' aim to include such a vast variety of car and racing types in the box is now a trademark specialty for the company. A bonus is that it can 'localise' the game for territories loyal to a particular series, such as our very own V8 Supercars. Globally this game is known as Race Driver, but thanks to the inclusion of Fords and Holdens, the game becomes 'V8 Supercars 3' in Australia.

If V8 Supercars is all you're interested in, the game will include all Australian circuits, plus the New Zealand Pukekohe round. Official AVESCO licensing means all teams and drivers are represented. Driving the cars is a comfortable compromise between an arcade racer and full simulation. Codemasters driving games have always had a unique driving model that isn't quite like any other game. It's less intuitive than other sims, but once you get a grip on how they like to be steered it's easy enough to translate those skills across the various cars modelled in the game.

Supercars 3 includes a spruced up graphical engine, and an all-new sophisticated damage modelling system. We hope that Codemasters' netcode is also spruced up; online play has always been rudimentary and imperfect with previous versions of this game.

Looking beyond V8s, the new game will also model classic F1 racers, as well as the 2005-season BMW-Williams. We're hard pressed to think of a category this game *doesn't* cover. It boasts GT, off-road, Touring Cars, Historic, Open Wheel, Rally and Oval racing. Let's hope the something-for-everyone racing doesn't cut corners to get it across the line.

Ben Mansill



X3: The reunion

DEVELOPER: Egosoft

WHEN: Christmas

WEB: www.egosoft.com

Space game fans are a tough bunch to please. It's all the fault of the game Elite, released way back in 1984, which spoiled players with a huge universe to roam and exploit, unconstrained by a storyline. Since then, many games have tried to replicate Elite's magic, and the galaxy's brightest hope yet is X3: The Reunion. Its predecessor (X2) was a potentially fine game, flawed by a horrendous interface which put many off. With lessons hopefully learned, developer Egosoft has promised to try harder with X3.

There is indeed a story-mode, but it can be ignored completely if the player desires. The universe promises to be dynamic and huge, meaning your actions will affect the grand scheme of things, but in a manner proportional to the size of the universe itself.

Players can spend as long as they wish in their own small ship, trading goods, pirating, or getting involved in regional conflicts. As success comes, you'll be able to add fleets of ships to your private space force. You'll be able to assign ships to any task that suits your goals. Send some off to pirate rich trade areas, or perhaps order the fleet to defend your own traders. Once set up, these fleets will continue to carry out your orders, or you can jump in and fly any ship, anytime. You can even buy factories, thus monopolising a commodity and extracting maximum profit.

Or, just fly around a universe alive with NPCs (Non Player Characters), ogling the beautiful graphics. Built with pixel shader 2.0 support, X3 looks stunning and if the gameplay measures up, the space grail may be wrested from Elite's aging hands.

Ben Mansill



WilliamsF1 Team Force
Feedback Racing Wheel



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On the CDs

Your guide to this month's cover discs

SpamCatcher 3.05*

SpamCatcher takes a very different approach to filtering email by tracking messages in real time through a set of central servers. For this to work, the clients must send information about your email back to the company, but only the digital hash is transmitted, so no-one will ever get to read your messages. See www.allume.com/win/spamcatcher/help-305/help_2a.html if you need more information.

You can choose not to participate in the SpamCatcher network, in which case the program will use regular spam tools like black and white lists instead. Either way, SpamCatcher will integrate neatly with Outlook, Outlook Express and most other email clients, with the minimum of setup hassle, ensuring your Inbox is protected within minutes of being installed.



UPGRADE OFFER

The latest version of SpamCatcher features improved Outlook Express support, an easier to use interface and brand new anti-phishing features. It also looks to see if emails are using sneaky formatting tricks to bypass anti-spam rules. As a SpamCatcher 3 user, you're entitled to a discount when you upgrade to the latest version. Point your browser www.allume.com to find out more.

STOP SPAM

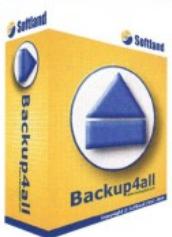
ROXIO MYDVD SLIDESHOW VCD EDITION*

After taking loads of great photos on holiday, you'll want to share them with others. That's not easy, of course: it's too many to email in a single file, and some family or friends may not have a PC anyway. MyDVD SlideShow lets you collect together all your favourite images on a single disc that can be played back on most stand-alone DVD players, or just about any PC with a software DVD player. You can even add a MP3 or WAV soundtrack to your slideshows. DVDs aren't supported in this version, but even writing to CD you still get almost 650MB to play with, more



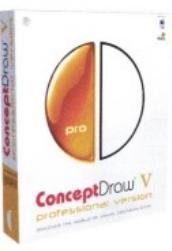
BACKUP4ALL 1.5*

Backing up your most valuable data is a hassle, whatever software you use, but Backup4all makes it quick and easy. A simple wizard will guide you through every step from choosing what to back up, to specifying a destination. It offers powerful include and export filters to let you control what you want to back up and you can choose to run full, or incremental backups to only back up modified files. There's also a scheduler, for running unattended backups, and even options to run specific programs before the backup starts. To register your copy of



CONCEPTDRAW V PERSONAL EDITION*

ConceptDraw can help you create everything from charts to floor plans. The creation process starts with the ConceptDraw Template Gallery which presents you with a long list of graphic categories to choose from, like Building Plans, FlowCharts, Maps and Technical drawings. Each graphics category then has a number of additional examples to help you get started. Once you've chosen a category, you can drag-and-drop the pre-made objects to make up your illustration and edit them to suit your needs. Register for your free serial number visit at www.conceptdraw.com/registration/cd5personal.php



than enough for most purposes. To register for your free registration code, visit: www.roxio.co.uk/keys

UPGRADE OFFER

For a limited time you can save 10 percent when you upgrade to another Roxio product such as Ease Media Creator. This includes MyDVD Slideshow and a huge range of other utilities for CD and DVD authoring, graphics and video editing, system backup and more. To see what products are on offer visit www.roxio.co.uk/adban/cd-upgrade_upgrade_aud.jhtml.

Backup4all, click Register from the Help menu within the program.

UPGRADE OFFER

The latest Backup4all includes differential backup, disk spanning, and integrated CD/DVD burning (no third party drivers or applications required). ZIP files may now be any size, files can be previewed before you restore them, and command line support allows common tasks to be automated in scripts. For a special offer, select 'Upgrade to Backup4all Pro 2' from the help menu within the program.

UPGRADE OFFER

The Standard version of ConceptDraw V adds more wizards, chart templates and libraries of shapes. It lets you create multi-page documents, and can export them in HTML, PowerPoint and other formats, should you need to. The Professional version offers extended import/export options, including AutoCAD DXF and Macromedia Flash, as well as adding its own ConceptDraw Basic scripting language. Visit www.conceptdraw.com/en/purchase/cd5upgrade.php for a special discounted upgrade offer.

*Online registration required

THE STATIONWAGON

The Stationwagon are an unsigned four-piece rock band from Townsville, Queensland with a sound which has been described as a 'collage of screaming guitars and fevered, effusive energy'. The band has supported acts such as Shihad, The Tenants, Filler and The Testeagles and has always been actively involved with Townsville's local music scene, working independently to organise more than 30 events to promote local bands. The band's ethic of hard work has helped them to perfect their live act and has awarded them a healthy respect from local musicians and venue managers.

Ozmusicweed



FREWARE

- Ad-aware SE Personal 1.06
- Adobe Reader 7.0
- AVG 7.0 Free Edition
- Google Desktop Search
- Horodruin 2.0.179.0
- IrfanView 32 3.97
- Mayk 1.6
- Mozilla Firefox 1.0.6
- Mozilla Thunderbird 1.0.6
- Password Corral 4
- Spybot Search & Destroy 1.4
- StartRight 1.2.8
- subpad 1.5
- The Sage 1.05
- Windows Media Player 10 (XP)
- Windows Media Player 9 (98/ME/2000)
- ZoneAlarm

Full Versions

- Backup4all 1.5
- ConceptDraw V Personal Edition
- Roxio MyDVD SlideShow VCD Edition
- SpamCatcher 3.05

Ozmusicweed

- Featured artist - The Stationwagon

Games

- MotoGP: Ultimate Racing Technology 3 demo

Freeware

- Ad-aware SE Personal 1.06
- Adobe Reader 7.0
- AVG 7.0 Free Edition
- Google Desktop Search
- Horodruin 2.0.179.0
- IrfanView 32 3.97
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- Mozilla Thunderbird 1.0.6
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- Spybot Search & Destroy 1.4
- StartRight 1.2.8
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- The Sage 1.05
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MotoGP: Ultimate Racing Technology 3

Feel the excitement of Grand Prix motorcycle racing in the latest game from the MotoGP series. Take control of your favourite bikes and riders from the 2004 MotoGP season and try to be first over the line. MotoGP now includes an extreme mode which takes the race to the streets. Customise and upgrade your bike to create the ultimate street racing machine.



AUSTRALIAN PC AUTHORITY

ON SALE 05 Oct 2005

NEXT MONTH...

MEDIA PCS

We're twelve months on from our last look at these multimedia monsters. Our next issue will look at the latest units on the market and compare them based on common entertainment tasks, features, and price. Does Microsoft still hold the crown? Do we have an EPG yet? Our November issue reveals all.



ULTRAPORTABLES!

They may be light and mobile, but ultraportable notebooks often compromise on features and performance. Next month, we round up the latest systems to find the most rounded roadwarriors out there.

NEXT-GEN GRAPHICS ROUNDUP

While we wait (and wait) for ATI's CrossFire cards, we're turning our benchmarks to NVIDIA's latest high powered 7800 series. We'll wring the last shred of a frame rate out of these blisteringly fast cards to give you the final word on where to spend your hard earned.



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